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VERTICAL IMPACT TESTS OF A MODIFIED F/FB-111 CREW SEAT TO EVALUATE HEADREST POSITION AND RESTRAINT CONFIGURATION EFFECTS

JAMES W. BRINKLEY
BERNARD F. HEARON, MAJOR, USAF, MC, FS
JAMES H. RADDIN, JR., LT COL, USAF, MC, FS
LAWRENCE A. McGOWAN, 1LT, USAF
JOSEPH M. POWERS, CMSGT, USAF

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AIR FORCE AEROSPACE MEDICAL RESEARCH LABORATORY
AEROSPACE MEDICAL DIVISION
AIR FORCE SYSTEMS COMMAND
WRIGHT-PATTERSON AIR FORCE BASE, OHIO 45433

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The voluntary informed consent of the subjects used in this research was obtained as required by Air Force Regulation 169-3.

This report has been reviewed by the Office of Public Affairs (PA) and is releasable to the National Technical Information Service (NTIS). At NTIS, it will be available to the general public, including foreign nations.

This technical report has been reviewed and is approved for publication.

FOR THE COMMANDER

HENNING E. VON GIERKE, Dr Ing
Director
Biodynamics and Bioengineering Division
Air Force Aerospace Medical Research Laboratory

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A test program was conducted to evaluate the effects of changes in (1) fore-aft headrest position, (2) upper extremity bracing, and (3) restraint harness configuration on human response to vertical impact. One-hundred and fifteen human tests were performed on the Vertical Deceleration Tower up to an impact level of 10.5 G mean (std dev = 0.14), 26 ft/sec velocity change. Subjects were restrained in either a proposed, modified F/FB-111 crew seat and restraint system or a conventional double shoulder strap - lap belt restraint harness and

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were exposed to comparable impacts in different upper extremity bracing conditions and at different fore-aft headrest adjustments. Measured data included seat acceleration and velocity, head and chest translational acceleration components, tri-axial forces acting on the seat and footrest, forces acting in the restraint harness attachments, and displacements of various body segments. Parametric analysis of the test results was conducted using the Wilcoxon paired-replicate rank test. With the headrest 2 1/4 inches forward of the plane of the seat back, there was increased forward and downward head rotation compared to the headrest 1 inch aft of the seat back plane. With the headrest 1 inch aft of the plane of the seat back, there was increased forward-translation of the head compared to the headrest 2 1/4 inches forward of the seat back plane. Subjects utilizing the hands-on-knees bracing position were found to carry a greater proportion of the load through the extremities to the footrest, thereby unloading the vertebral column, than subjects using the hands-in-lap position. Finally, the proposed, modified F/FB-111 crew seat and restraint system was found to react a greater proportion of the impact response through the harness compared to the conventional double shoulder strap - lap belt configuration. Additional impact tests with human volunteer subjects exploring fore-aft headrest adjustments between the extremes investigated in this study may be useful. The findings of the restraint harness configuration comparison may be clarified by additional vertical impact tests of the conventional harness with an added crotch strap.

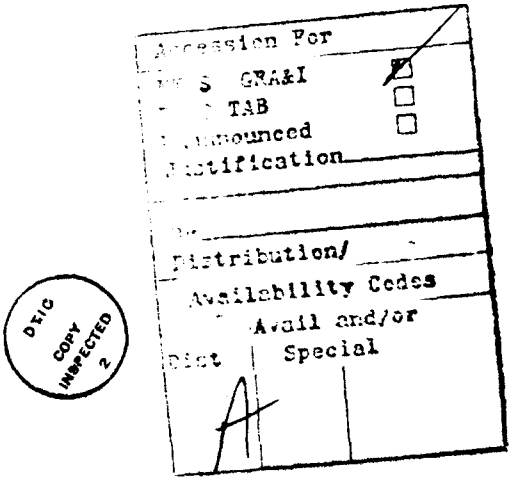
PREFACE

This report was prepared by the Biomechanical Protection Branch, Biodynamics and Bioengineering Division of the Air Force Aerospace Medical Research Laboratory. The impact facilities and data collection equipment were operated by the Scientific Services Division of the Dynalectron Corporation under Air Force Contract F33615-79-C-0523. Mr. Harold F. Boedeker was the Engineering Supervisor for the Dynalectron Corporation.

The test fixture used during the experimental phase of the effort was designed and built by General Dynamics, Fort Worth Division. Photographic support was provided by the 4950th Test Wing, Technical Photographic Division. Special acknowledgement is given to Mr. Paul Creiger for operation of the high-speed motion picture cameras and to the many personnel who provided still photography coverage.

Anthropometric measurements of the test subjects were collected by Mr. Charles E. Clauser, Dr. Kenneth W. Kennedy, and Lt Col Maureen Lofberg of the Workload and Ergonomics Branch, Human Engineering Division of the Air Force Aerospace Medical Research Laboratory.

The authors wish to express their gratitude to the personnel of the Biomechanical Protection Branch who participated in the planning, preparation, and performance of the research program and in the preparation of this report. Special commendation is also given to the Air Force officers and airmen who volunteered to participate in the impact tests. The devotion, skill, and professionalism of the entire team of government and contractor personnel were vital to the successful and safe accomplishment of this evaluation.



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INTRODUCTION

A. BACKGROUND

A review of the operational F/FB-111 ejection data by Kazarian (1977) indicated that the vertebral fracture rate among survivors was 40.3% (25 of 62) for the period October 1967 to June 1977. The majority of these injuries was attributed to the retraction phase of the escape sequence. Twenty-nine percent (18 of 62) of the survivors were believed to have incurred hyperextension or combined hyperextension-hyperflexion vertebral fractures (Kazarian et al., 1979). Furthermore, the potential for negative shoulder strap angles (with respect to the reference aircraft waterline) was implicated as the cause of these hyperextension injuries. It was suggested that elevation of the inertia reel and reflection strap anchor points of the F/FB-111 shoulder harness would alleviate the hyperextension injuries presumed to occur during retraction and the smaller number of hyperflexion injuries presumed to occur during landing impact.

In order to reduce this relatively high vertebral fracture rate, a program to develop appropriate modifications to the F/FB-111 crew seat and restraint system was undertaken by the Life Support System Program Office of the Aeronautical Systems Division (ASD/AES). This redesign effort, based on the aforementioned injury mechanism assessment by Kazarian, had the following objectives: (1) eliminate the downward component of vertebral loading caused by the shoulder straps during retraction, (2) reduce the forward and downward rotation of shoulders and back on landing impact, and (3) extend the seat back to provide upper back support during powered inertia reel retraction. Following a feasibility study exploring possible approaches to improve the crew seat and restraint system, General Dynamics Corporation proposed hardware modifications to achieve the above redesign objectives. After the prototype modified system was fabricated, the Air Force Aerospace Medical Research Laboratory (AFAMRL) began an extensive demonstration test program with human subjects to evaluate the system. The objectives of this research program were to (1) assess the adequacy of the restraint as an impact protection device, (2) quantify the shoulder harness geometry for a range of subject anthropometry, and (3) uncover any areas of performance degradation.

This evaluation revealed a number of shortcomings in the proposed modification. The anthropometric study revealed that negative shoulder strap angles were still possible for some subjects in some seat configurations, despite the higher locations of the tie-down points of the shoulder straps in the modified system. As a result of the elevation of these anchor points, it was necessary to remove 2.34 inches from the lower aspect of the headrest to assure adequate clearance for the shoulder straps. An anthropometric study also indicated that this modified headrest significantly degraded head support. It was estimated that 38% of flyers would not have even marginal head support with the seat back at the 90° position, 75% would not have adequate support with the seat back reclined to 103°, and 94% would not have adequate support with the seat back reclined to 110°. Marginal head support requires that the helmet contact point be 1 inch above the lower aspect of the headrest. Data obtained from the impact test program established the modification as an adequate impact protection device, but also suggested that lateral and vertical impact protection

performance of the system had been degraded by the modification (Brinkley et al., 1981).

This proposed, modified F/FB-111 restraint system, like the operational harness, incorporates a number of features which depart from standard USAF design practice. A number of these features permit the imposition of adverse spinal loading on the crewmember. For example, a maladjustment of the shoulder harness yoke assembly may limit torso erection and produce downward spinal loads during retraction of the shoulder straps by the powered inertia reel. Alternate, plausible mechanisms of vertebral fracture resulting from these design deviations, which were not addressed by the proposed modification, were clearly delineated during the original demonstration test program. At the same time, a re-evaluation of the operational ejection data (Hearon et al., 1981, 1982) failed to implicate negative shoulder strap angles as the vertebral fracture etiology and concluded that axial compression and flexion of the vertebral column on landing impact of the crew module was often the mechanism of vertebral fracture. The relative clinical benignity of the majority of these fractures, expressed in terms of the number of days the involved crewmembers were grounded or hospitalized, was also demonstrated. On the basis of the aforementioned shortcomings of the proposed modification, reassessment of vertebral fracture injury mechanisms, and the results of a subsequent human vertical impact test program in which the operational F/FB-111 crew seat and restraint system was compared to the proposed modification (Hearon et al., 1982b), the proposed modification was rejected.

The present study was conducted to clarify the test results obtained in the original demonstration test program of the proposed modification (Brinkley et al., 1981). For example, the initial vertical test series revealed statistically significant increases in head acceleration in some test configurations which may have been attributed either to the crew seat headrest position or to the restraint configuration. Other findings may have been influenced by the use of upper extremity bracing (hands-on-knees) by the subjects in the initial test program. Therefore, a controlled experiment to assess the influence of headrest position, upper extremity bracing, and restraint harness configuration was designed.

The fore-aft headrest position in the F/FB-111 is adjustable in 1 inch increments, over a longitudinal distance of 6 inches, as shown in Figure 1. The most forward location of the headrest is such that the helmet-headrest contact plane is 2 1/4 inches forward of the seat back plane. This headrest position was dictated by a United States Navy requirement to provide adequate head support to maintain over-the-nose vision during carrier launches. The current USAF design specification for capsule emergency escape systems (MIL-C-25969B, 1970) indicates that the headrest should be located 1 inch aft of the plane of the seat back. The adjustable F/FB-111 headrest, therefore, represents a significant departure from standard design practice.

With the headrest in the full forward location, the seat occupant's head and neck are adversely flexed forward in the so-called "turkey vulture" position. (See Figure 2.) This preflexed position of the head and neck creates an additional moment acting on the vertebral column and causing a downward and forward rotation of the head and upper torso during vertical impacts, such as those experienced during ejection and landing impact of the crew module. In the initial demonstration test program of the proposed, modified F/FB-111 crew seat and

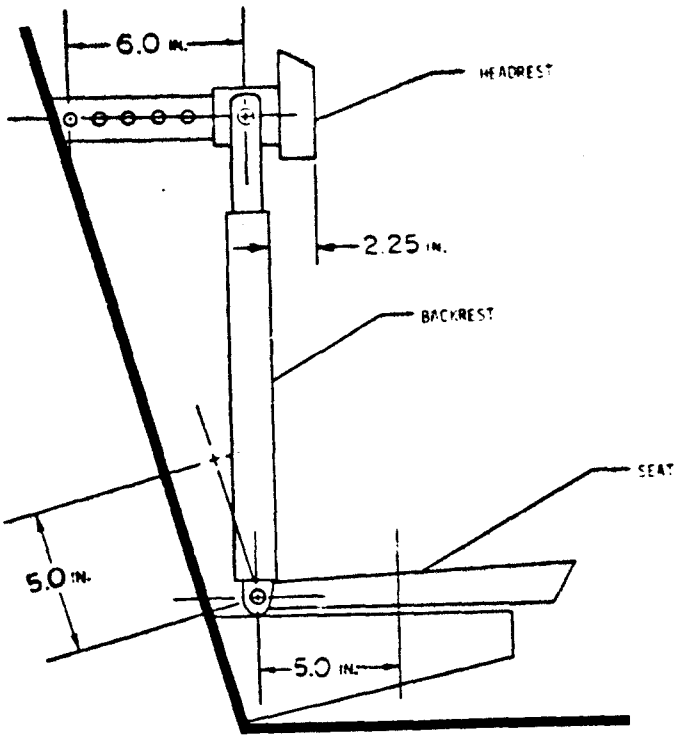

Figure 1. F/FB-111 Crew Seat Geometry with Headrest Forward. (Seat and seat back cushions are not shown.)

restraint system, forward head acceleration experienced during vertical impact tests increased as the seat back angle was erected from a reclined to an upright position (90^{0} to the aircraft waterline). This forward head acceleration may have been less in the 90^{0} seat back condition, if the headrest did not pre-position the head so far forward of the plane of the seat back. The fundamental principles of impact protection dictate that head displacements and accelerations be minimized during whole body impact acceleration to minimize the risk of injury.

The earliest recommendation on headrest location for an ejection seat appears to be in a 1946 document which summarized the state-of-the-art of escape biotechnology at that time. The memorandum (Cofer et al., 1946) indicated that the headrest should be located so that the head will not move below it when the body moves downward relative to the seat during ejection. Furthermore, it was recommended that the headrest be adjustable in the fore-aft direction so that the head may be positioned with its center of gravity over or slightly forward of the longitudinal axis of the cervical vertebrae. This recommendation was based on the presumption that a more severe injury would be incurred by backward rotation of the head (hyperextension of the cervical spine) then by forward rotation of the head (hyperflexion). Later, human ejection tower tests using a T-2 catapult (Ames and Savely, 1948) were conducted to examine impact response in various headrest positions. In these tests, the fore-aft location of the headrest was varied over a range of 2 inches from 1/4 inch to 2 1/4 inches aft

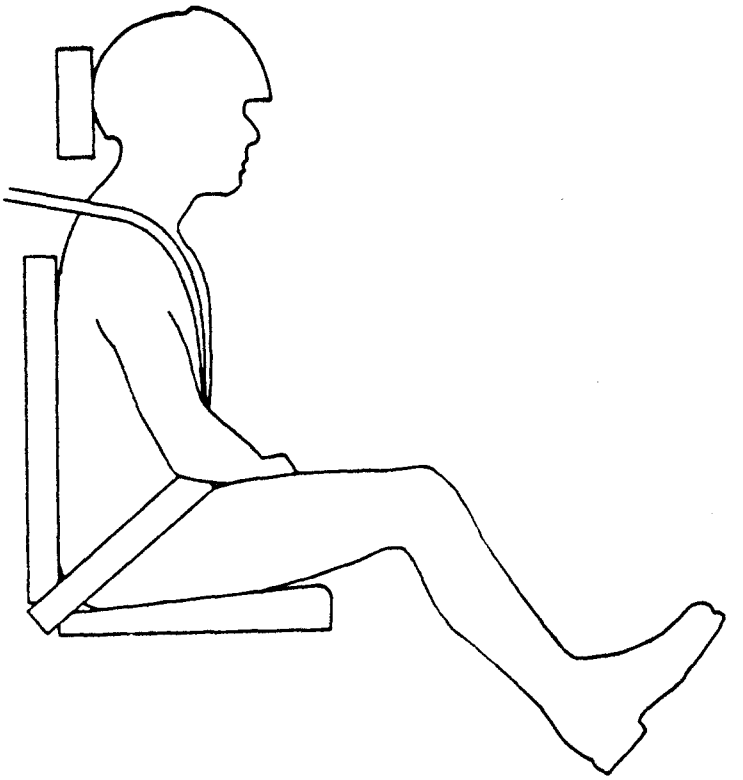

Figure 2. "Turkey Vulture" Position. The cervical spine is flexed due to the forward location of the headrest.

of the plane of the seat back. The study noted that hyperflexion occurred if the headrest was positioned too far forward and that hyperextension occurred if the headrest was positioned too far aft. It was stated that the risk of neck injury (muscle strain) during ejection could be minimized by the proper fore-aft position of the headrest. This position was noted to vary from subject to subject. In order to achieve the proper headrest adjustment, the subject's earlobe was aligned directly over the center of his shoulder.

The initial Aerospace Medical Research Laboratory recommendation regarding placement of ejection seat headrests was that the headrest should be adjustable, from 0 to 3 inches aft of the plane of the seat back, or fixed, 1 3/4 inches aft of the seat back plane. Finally, the USAF design specification adopted was that the plane of the headrest would be 1 inch aft of the plane of the seat back. This specification is the same for open ejection seat aircraft (MIL-S-9479B, 1971) as it is for encapsulated escape systems. However, of the escape systems currently used in the Air Force, the Martin-Baker, the ESCAPAC, the ACES II, and the F/FB-111 crew seat and restraint system all deviate from this design specification.

B. PROGRAM OBJECTIVES

The primary objectives of this research effort were to evaluate the effects of changes in (1) the headrest position, (2) upper extremity bracing, and (3) restraint harness configuration on human response to vertical impact. Specifically, the extreme forward adjustment position of the F/FB-111 headrest was compared to the more conventional aft position of the headrest. The hands-on-knees bracing technique, utilized during the initial demonstration test program of the F/FB-111 crew seat and restraint system, was compared to a position in which the hands were relaxed in the lap to preclude upper extremity bracing. Also, the proposed, modified F/FB-111 harness was compared to the more conventional double shoulder strap - lap belt configuration. The secondary objective of this test program was to provide data for ongoing research efforts to develop mathematical models to predict human impact response.

This report (1) describes the impact tests accomplished to meet the above program objectives, (2) presents analysis and interpretation of the collected data, (3) summarizes the results of the evaluation, and (4) provides recommendations which are supported by the test results.

SECTION 2

TECHNICAL APPROACH

A. EXPERIMENTAL DESIGN

The following null hypotheses were evaluated during this test program. First, human response to vertical impact with the headrest forward of the plane of the seat back is not significantly different from such response with the headrest aft of the plane of the seat back. Second, human response to vertical impact with subjects utilizing a hands-on-knees bracing technique is not significantly different from such response in the absence of upper extremity bracing. Third, human response to vertical impact in a proposed, modified F/FB-111 crew seat and restraint system is not significantly different from such response in a conventional double shoulder strap - lap belt restraint configuration.

TABLE 1. EXPERIMENTAL MATRIX

		HEADREST POSITION	
HARNESS TYPE	SUBJECT BRACING	2½" FORWARD	1" AFT
Modified F-111	Hands-On-Knees	A	B
Modified F-111	Hands-In-Lap	C	D
Conventional	Hands-In-Lap	E	F

The design matrix for this factorial experiment is shown in Table 1. All tests in the matrix were conducted in the F/FB-111 crew seat with the plane of the seat back parallel to the impact vector. This seat configuration was achieved by adjusting the headrest full forward and the seat pan full aft, as shown in Figure 1. Subjects were tested at the same seat elevation for each test in the experimental matrix. The full down seat position was selected for evaluation. However, those subjects with relatively small sitting heights did not have adequate helmet support in the full down seat position. Adequate helmet support was assumed if the approximate Frankfort horizontal plane (defined by the lowest points in the inferior orbital rims and the mid-point of the line connecting the highest points in the margin of the auditory meati) of the subject was in contact with the headrest. For those subjects, the seat was elevated until minimum helmet support, according to the above definition, was provided.

The above test conditions were selected for investigation based on the need to clarify previous results of tests conducted under similar conditions (Brinkley et al., 1981). For example, in the previous demonstration test program, forward head accelerations and vertical seat loads were significantly higher with the seat back angle at 90° than with the seat back angle at 103° or 110°. Selecting the 90° seat back angle condition for evaluation in this test program, therefore, allowed greater observability of the effects of variations in restraint configuration and subject bracing. Furthermore, controlling these seat adjustment parameters permitted a wider comparability among cells in the experimental matrix.

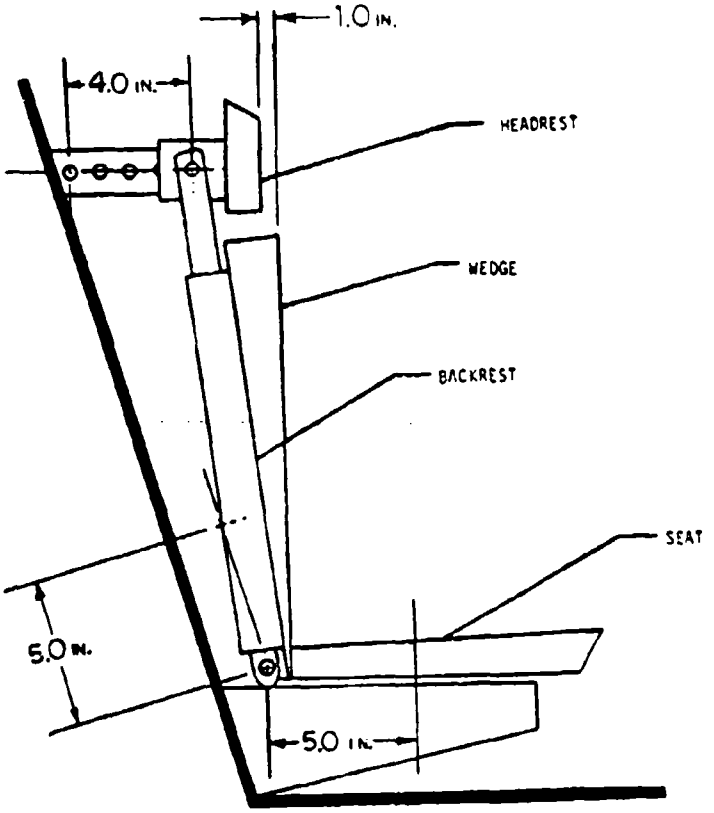

Figure 3. F/FB-111 Crew Seat Geometry with Headrest Aft (Seat and seat back cushions are not shown.)

As shown in Table 1, tests in cells A, C, and E of the experimental matrix were conducted with the headrest contact plane 2 1/4 inches forward of the seat back plane. Tests in cells B, D, and F of the experimental matrix were conducted with the headrest contact plane 1 inch aft of the seat back plane. The latter test conditions were achieved by placing a wooden wedge between the actual seat back and the F/FB-111 seat back cushion, thereby moving the effective seat back plane forward of the headrest. Thus, comparisons A-B, C-D, and E-F, revealed the differences in impact response due to variation in fore-aft headrest position. (See and compare Figures 1 and 3.)

For all tests in this series, subjects were instructed to brace their helmeted head against the headrest and their feet against the rudder pedals of the test fixture. For tests in cells A and B only, subjects were also instructed to brace their hands against their anterior thighs or knees, as had been done in the previous demonstration tests of the proposed, modified F/FB-111 crew seat and restraint system. However, for tests in cells C, D, E, and F, subjects were instructed to relax their upper extremities and to fold their hands loosely in their laps in order to preclude upper extremity bracing. Therefore, comparisons A-C and B-D revealed the differences in impact response due to this variation in subject bracing. (See and compare Figures 4 and 5.)

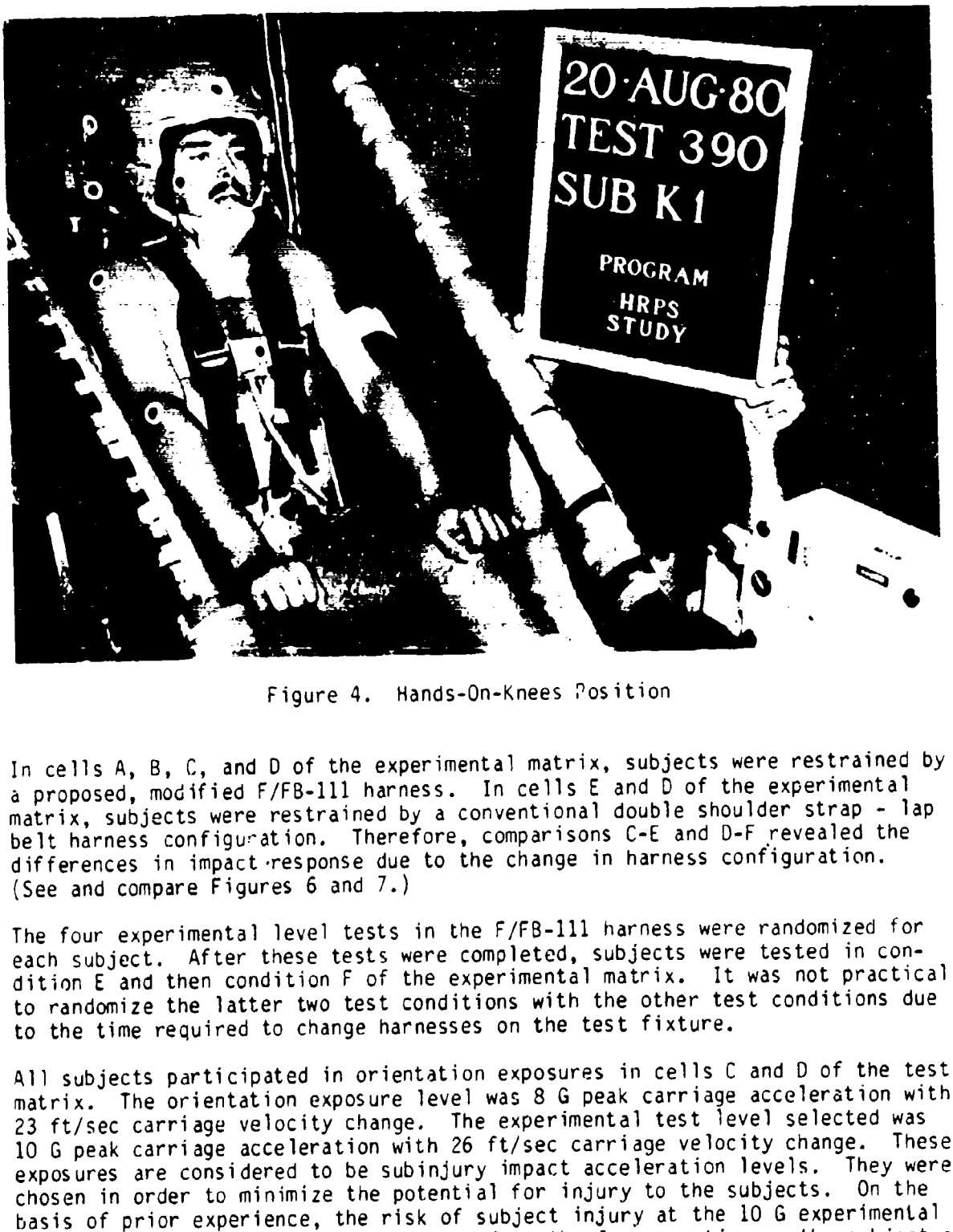

Figure 4. Hands-On-Knees Position

In cells A, B, C, and D of the experimental matrix, subjects were restrained by a proposed, modified F/FB-111 harness. In cells E and D of the experimental matrix, subjects were restrained by a conventional double shoulder strap - lap belt harness configuration. Therefore, comparisons C-E and D-F revealed the differences in impact response due to the change in harness configuration. (See and compare Figures 6 and 7.)

The four experimental level tests in the F/FB-111 harness were randomized for each subject. After these tests were completed, subjects were tested in condition E and then condition F of the experimental matrix. It was not practical to randomize the latter two test conditions with the other test conditions due to the time required to change harnesses on the test fixture.

All subjects participated in orientation exposures in cells C and D of the test matrix. The orientation exposure level was 8 G peak carriage acceleration with 23 ft/sec carriage velocity change. The experimental test level selected was 10 G peak carriage acceleration with 26 ft/sec carriage velocity change. These exposures are considered to be subinjury impact acceleration levels. They were chosen in order to minimize the potential for injury to the subjects. On the basis of prior experience, the risk of subject injury at the 10 G experimental level was acceptably low. At the same time, the forces acting on the subject at this exposure level are generally sufficient to overwhelm the variable forces

Figure 5. Hands-In-Lap Position

created by voluntary neck and torso muscle contraction, thereby producing a response suitable for comparative parametric analysis.

The sample of subjects selected to participate in this test program is comparable to a flying population in terms of age, sex, and anthropometry. Fifteen males and one female subject participated in this test program. The medical screening of all subjects prior to participation is more highly selective than a routine USAF Flying Class I evaluation. This results in a panel of volunteers who are expected to be supranormal in terms of impact injury tolerance (Hearon and Raddin, 1981). This difference in the populations of interest has a negligible influence on the significance of results of tests such as these, since all tests were conducted below the anticipated injury threshold, even for a normal population. Such a conservative approach to subject screening is necessary to assure subject safety.

Impact tests were conducted in all cells of the experimental matrix using an anthropomorphic dummy prior to initiating tests with volunteer subjects. As an additional safety precaution, a dummy test was performed each day prior to testing with human subjects. The controlled variables during these experiments were the carriage drop height, the seat horizontal and vertical adjustment, the headrest adjustment, the upper extremity bracing technique, the restraint

Figure 6. Proposed, Modified F/FB-111 Restraint Harness

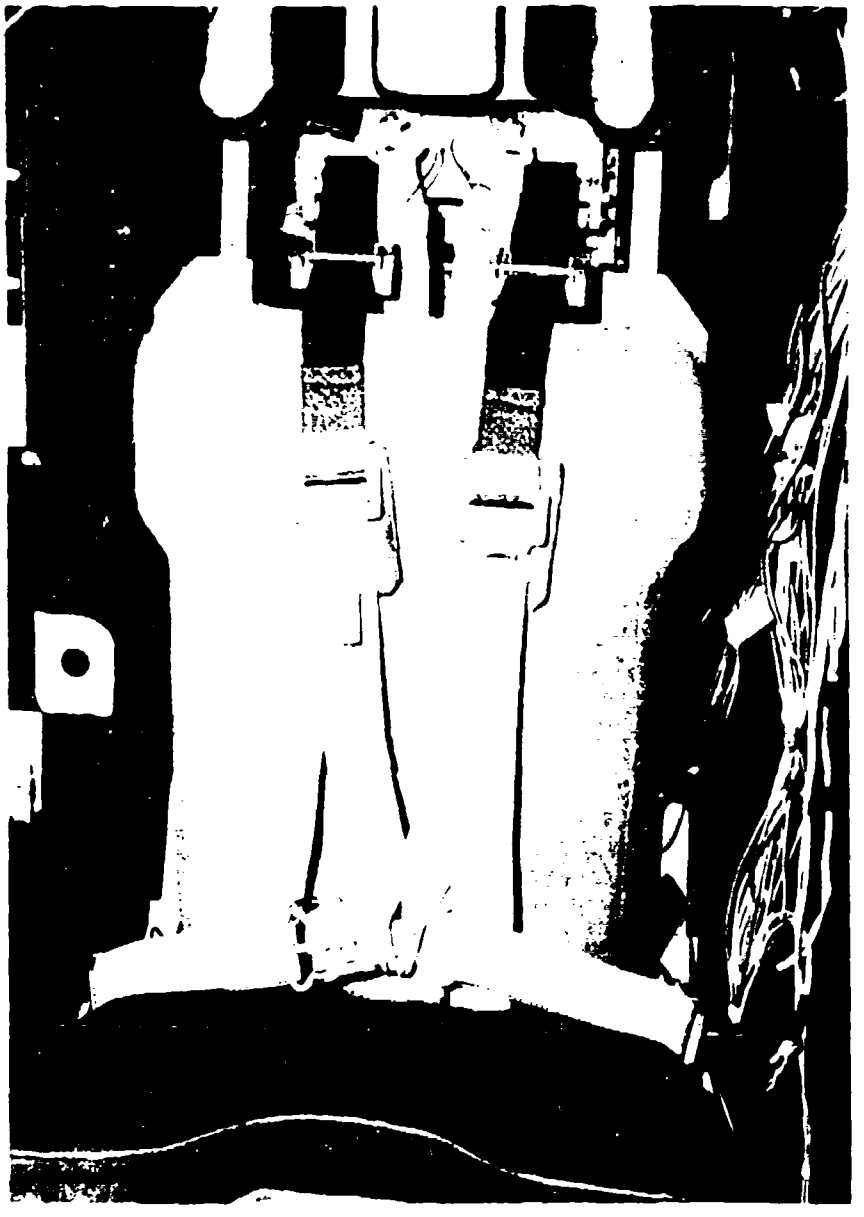

Figure 7. Conventional Double Shoulder Strap - Lap Belt Configuration

harness, and the subject population. The carriage drop height was 8.5 feet for the 8 G orientation tests and 11.0 feet for the 10 G experimental level exposures.

The observable variables which were measured during these experiments included the restraint harness geometry (e.g., shoulder strap angles), the restraint harness static preloads, the restraint harness loads during impact (e.g., shoulder strap and lap belt loads), the forces (horizontal, lateral, and vertical) in the seat and footrest, the triaxial translational acceleration components measured at the seat and at the subject's head and chest, and the displacements (with respect to the seat) of photometric targets fixed to the subject. The potential measurement error of accelerometers, load cells, strain gages, and other devices utilized to make these measurements is described in Appendix A.

Significant unobservable variables during these experiments included the motion of each vertebral body and the force distribution along the vertebral column during the impact event.

B. EVALUATION CRITERIA

The electronic measurements obtained during these experiments included the tension-time histories of the various restraint harness straps measured at their attachment points, the force-time histories of the loads measured at the seat and footrest, and the acceleration-time histories of the subject's head and chest and of the seat and drop carriage as well. The accelerometer arrays attached to the subjects were, in general, rotating measurement coordinate frames which measured translational acceleration components summed with translational components resulting from angular motions. One implication of this measurement technique is that, as the head rotated downward and forward, vertical acceleration of the head with respect to the laboratory reference frame partially transitioned from a Z axis (vertical) to an X axis (fore-aft) measured acceleration with respect to the head. This situation is illustrated in Fig. 8. Another implication is that separation of translational accelerations of the effective center of gravity and translational acceleration components resulting from rotational motions cannot be achieved with the three orthogonal linear accelerometers utilized in these experiments. The relevant equations have been summarized elsewhere (Simons et al., 1979). For the purposes of this test program, it was adequate to measure the mixed translational acceleration data and record rotational motion photometrically.

Evaluation of the entire measured acceleration-time histories of chest and head was accomplished by calculating Severity Indices (Gadd, 1966). These single parameters, which were derived by a weighted integral of the acceleration-time function taken over the interval of the impact ($SI = \int a^n(t)dt$, where $n = 2.5$), were used to compare the severities of impact responses. No exposure limit values were assigned to the chest or head acceleration Severity Indices. Instead, they were used only in a relative sense for purposes of comparison.

The Wilcoxon paired-replicate rank test (Wilcoxon & Wilcox, 1964) was the statistical technique selected to compare the peak values of specific measured parameters and to establish the statistical significance of observed trends in the data. Experimentally-measured parameters for each subject were arithmetically compared with the same parameters measured for the same subject in a

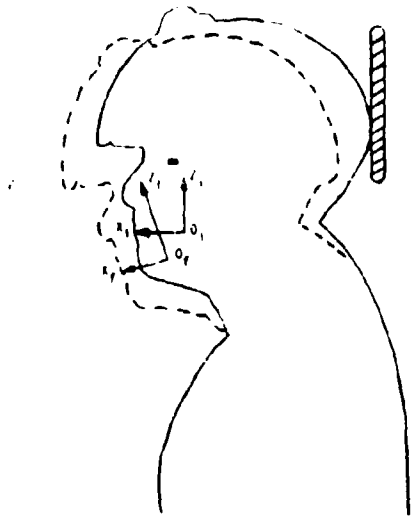

Figure 8. Rotation of the Accelerometer Array at the Head During Vertical Impact

different (but comparable) test condition, thereby establishing pair differences. When a sufficient number of pair differences for a specific parameter changed in the same direction for a variety of subjects, a trend was established as statistically significant by the Wilcoxon technique. The 90% confidence level was defined as the level of statistical significance for rejection of the null hypothesis, assuming a two-tailed test.

The advantages of employing this statistical technique are particularly noteworthy in these experiments. The technique is comparative and, therefore, is readily applied to the comparison of different headrest positions, upper extremity bracing techniques, or restraint harness configurations. Also, the method establishes each subject as his own control, thereby reducing the effects of biological variability on the data. In addition, a relatively small number of paired-replicates (5) is the minimum number required to permit a valid conclusion at the chosen significance level.

The disadvantages of the Wilcoxon technique, however, must also be considered. Although the trend (direction) of a statistically significant difference in a given parameter is indicated, the magnitude of that difference is not quantified by the technique. (The difference between the means of the two sets of parameters being compared may be easily computed, however.) The method is also less sensitive than, for example, the analysis of variance. As in any statistical technique, statistical significance can be computed, but practical significance must be judged.

Statistically significant trends in test parameters between two comparable test conditions were critical in this evaluation. Generally, trends in specific parameters differ in practical importance. In this test program, for example, there was limited interest in the loads reacted into the lap belt, since all tests were conducted in the Z axis with an unreclined seat back, thereby minimizing variation in lap belt reaction loads. The more crucial considerations

were the trends in the experimentally-measured seat reaction loads and the head and chest accelerations. At this time, the loads reacted at the seat are the best indirect measurement of the magnitude of vertebral column loading during impact.

In the final analysis, the overall distribution of statistically significant trends in all test parameters being compared generally assumes greater importance than the trend of any single parameter. At times, a "beneficial" trend in one parameter may be accompanied by a "detrimental" trend in another. In this circumstance, a careful evaluation of the "trade-offs" among parameters is necessary, in order to accurately assess which test configuration is "best" or perhaps which is the lesser of two evils. It is conceivable that, in some circumstances, such a determination may not be possible.

For ethical and moral reasons, it is not possible to design and conduct impact experiments in the laboratory with human subjects at operational exposure levels where there is a known probability of injury. These tests, therefore, were performed at subinjury impact levels which have been demonstrated to be well within human tolerance and where the risk of injury is acceptably low. However, the levels were sufficiently high to overcome voluntary muscle resistance and approach the operational range. Increasing the magnitude of the impact accelerations could be expected to lead to increases in response until a non-linearity occurs in the form of injury. The statistically significant trends reported herein for this experimental level cannot be extrapolated to operational levels for the purpose of predicting injury rates. However, the trends discovered at this experimental level should be valid with increasing levels of impact until the non-linearities associated with injury are encountered.

SECTION 3

TEST EQUIPMENT, METHODS, AND FACILITIES

A. VERTICAL DECELERATION TOWER

The AFAMRL Vertical Deceleration Tower (VDT), shown in Figure 9, was used for this impact test series. This facility consists of a 60 ft vertical steel tower, which supports a guide rail system, an impact carriage, a hydraulic deceleration device, and a test control and safety system. The impact carriage used to carry the test specimen can be elevated to a maximum height of 42 ft prior to release. After release, the carriage falls until a plunger attached to the carriage enters a water-filled cylinder located at the base of the tower. The deceleration profile produced as the plunger displaces the water in the cylinder is a function of the free fall distance, the carriage and test specimen mass, the shape and size of the plunger, and the diameter of the cylinder orifice.

A typical acceleration-time history recorded on the impact carriage during this test program is shown in Figure 10. The 10 G test level mean peak carriage acceleration for the entire vertical test series was 10.5 G with an estimated standard deviation of 0.14.

B. CREW SEAT, RESTRAINT SYSTEMS, AND SEAT INSERT

The operational F/FB-111 restraint system, shown in Figure 11, consists of a lap belt, double shoulder strap, and crotch strap configuration. The harness is attached to the crew seat at five points and to the inertia reel at two points. The shoulder strap geometry is unique in that the straps originate from the inertia reel, pass through the rollers attached to the shoulder strap yoke, and are attached to the top of the back rest on the opposite side of the seat. The intent of this cross-over geometry is to provide sideward impact protection. The lap belt is attached to the seat structure at the seat reference axis (the intersection of the plane of the seat back and the seat pan). The crotch strap (also referred to as the anchor strap or negative G strap) is attached to the front of the seat pan. The shoulder straps are attached to the shoulder strap yoke below the rollers above the chest strap adjustment buckles. The lap belt, crotch strap, and lower portion of the shoulder straps (chest straps) are constructed of 1 3/4 inch wide Terylene webbing. The shoulder straps attached to the inertia reel are made of 1 3/4 inch wide polyester webbing (Type I, MIL-W-25361).

Under Contract No. F33657-78-C-0651 with the Life Support System Program Office, the General Dynamics Corporation redesigned the F/FB-111 crew seat and restraint system. The proposed redesign consisted of (1) rerouting the inertia reel straps to raise the shoulder strap tie-down point of the inertia reel, (2) moving the cross-over (or reflection) strap attachment points up to the headrest support frame, and (3) increasing the height of the backrest. These proposed modifications are shown in Figure 12. Rerouting the inertia straps was accomplished by two sets of rollers attached to the inertia reel assembly. These rollers increased by 1.9 inches the height of the points through which the retraction loads would be applied to the crewmember and through which a portion of the inertia loads of the crewmember would be carried during crew module

Figure 9. AFAMRL Vertical Deceleration Tower and F/FB-111 Test Fixture Viewed from Below.

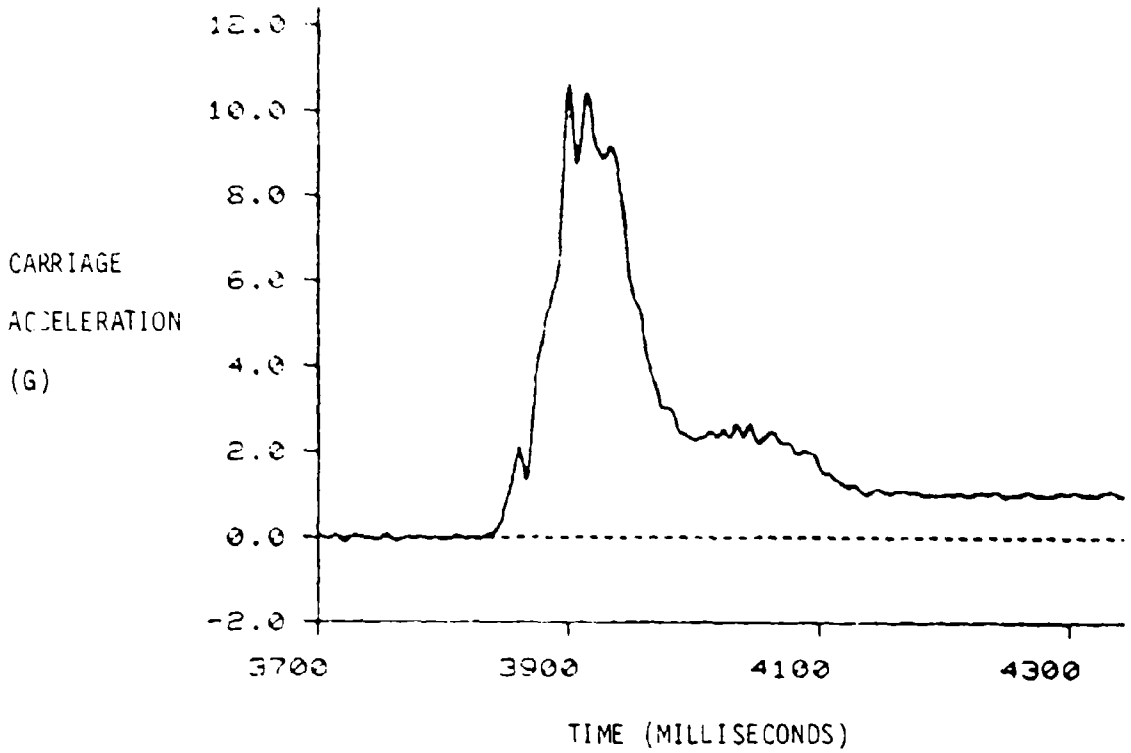

Figure 10. Typical Carriage Acceleration Profile at the Experimental (10 G) Test Level

acceleration in the escape sequence. The reflection strap attachments were mounted to anchor points at waterline 203.2 in the headrest support frame. These anchor points moved with the headrest during fore-aft adjustment. The height of the backrest was increased by 2 1/4 inches. A portion of this backrest extension on each side was recessed by 1 1/4 inches in order to provide clearance for the inertia reel straps when the seat was adjusted to its upper limit. For the same reason, 2.66 inches of the lower aspect of the headrest support surface was removed in the proposed modification. However, the restraint harness assembly itself was not changed in the proposed modification.

The other harness utilized in this test program was a standard USAF double shoulder strap - lap belt configuration (Figure 7). The shoulder straps were an adjustable Type MB-6 harness, constructed of 1 3/4 inches wide polyester Type I webbing, in accordance with specification MIL-H-5364D, 1972. In static tests, the webbing is capable of carrying an ultimate load of 3600 pounds. The lap belt was the HBU lap belt (without the automatic release buckle), constructed of 1 3/4 inches wide nylon webbing (Type XIII, MIL-W-4088H). The breaking strength of this material is 6500 lb.

Each restraint system was pretensioned prior to the impact experiment. The lap belt pretension was 20 ± 5 lb measured by strain gages mounted on the lap belt end attachment fittings. The total load acting on each shoulder strap was set at 14 ± 5 lb by measuring the loads at the end fittings of each reflection strap

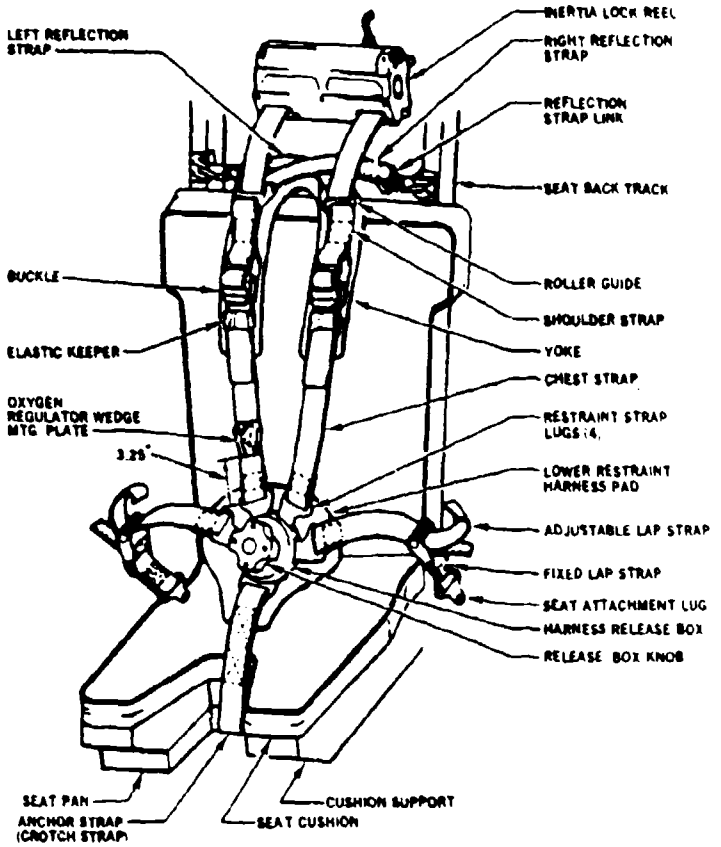

Figure 11. Operational F/FB-111 Restraint Harness

and using Lebow gages attached to the inertia reel straps. This preload procedure imposes a load on the subject which is lower than the maximum load (50 lb in each shoulder strap) expected during operational use of the F/FB-111 inertia reel. The conventional harness as well as the F/FB-111 harness was pretensioned in order to assure comparability of the pre-impact test conditions.

Previous tests of similar restraints in England (Reader, 1967) and at Holloman AFB (Zaborowski, 1965) resulted in subject complaints when preloads of 50 lb or greater per strap were imposed. In view of these reports, and since imposition of static preloads on the subject was required for relatively long periods of time (approximately 15 minutes) prior to the impact event, imposition of preloads of such magnitude was neither practical nor desirable. In addition, previous experience at AFAMRL has shown that significant variations in restraint performance do not occur unless the pretension is well below 20 lb. Therefore, the aforementioned pretensions were deemed adequate.

All tests in this program were conducted in a crew seat which was salvaged from an F-111 crew escape module. The seat was mounted to the vertical deceleration tower by a structure designed and fabricated by the General Dynamics Corporation. This test fixture, shown in Figure 13, supported the seat and the rudder pedal footrest. The seat was adjustable horizontally and vertically over 5 inches in 1 inch increments. The seat and rudder pedals were instrumented to measure the

Figure 12. Proposed Modifications to the F/FB-111 Restraint System

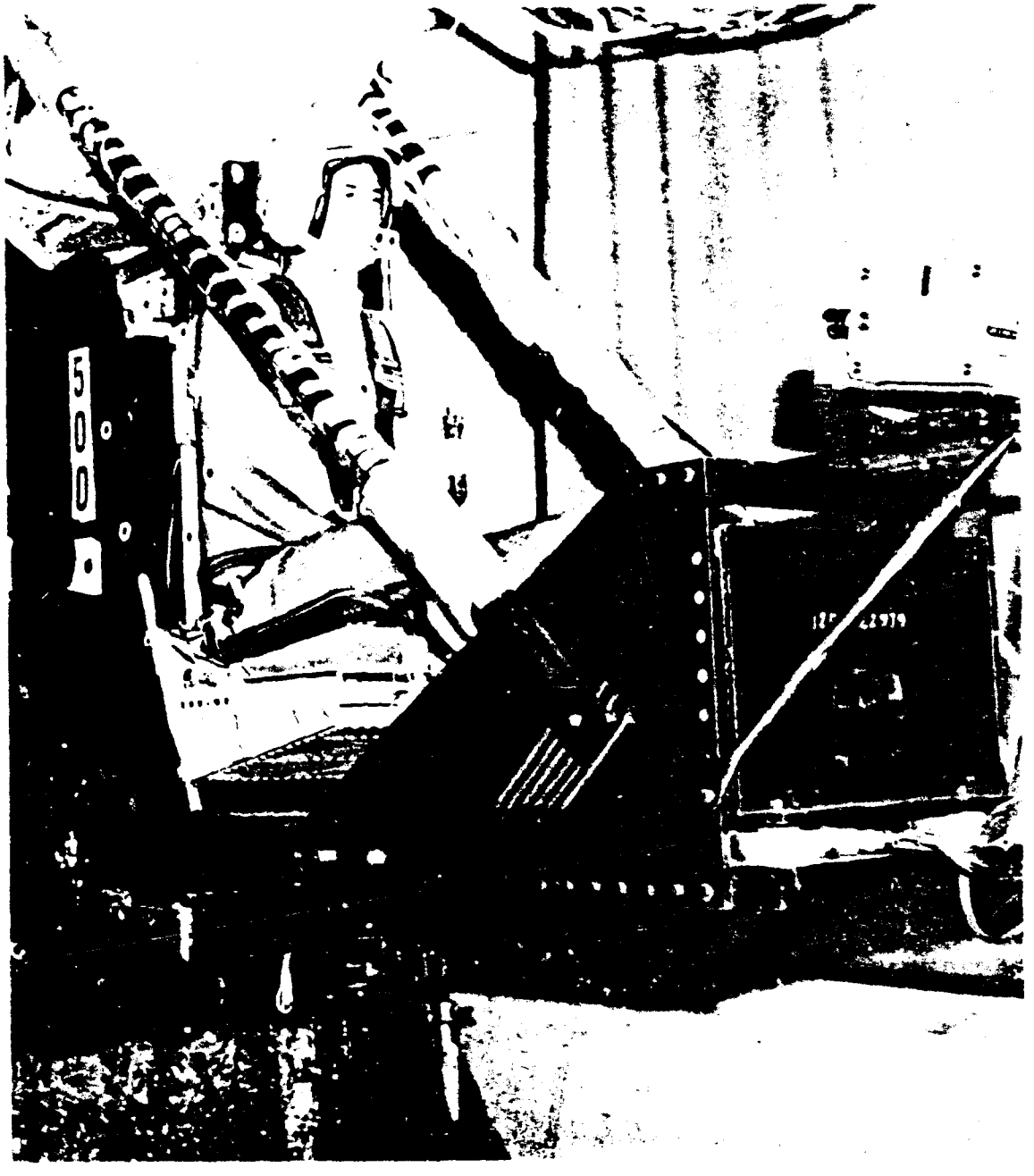

Figure 13. Test Fixture with Rudder Pedal Support Structure

loads reacted by the subject into these structures during the impact. The seat and test fixture are more completely described elsewhere (Brinkley et al., 1981).

The inertia reel was not used in this test program. It was replaced by a simple webbing clamp bar located at a position equivalent to the centerline of the actual reel.

The modified F/FB-111 headrest was used for all tests in this program. As previously noted, 2.66 inches of the lower aspect of the operational F/FB-111 headrest had been removed in the proposed modification. The headrest, which was adjustable over a horizontal distance of 6 inches in 1 inch increments, was moved to the full forward position to achieve the 90° seat back angle condition with the headrest 2 1/4 inches forward of the plane of the seat back. (The seat was adjusted to the full aft position. This configuration is shown in Figure 1.) To achieve the position with the headrest 1 inch aft of the plane of the seat back, the headrest was adjusted 2 inches aft and a seat insert was placed between the seat back and the seat back cushion. This wooden seat insert is shown in Figure 14. This 5.5° wedge was utilized to maintain a 90° seat back angle and the impact vector parallel to the plane of the effective seat back, as shown in Figure 3.

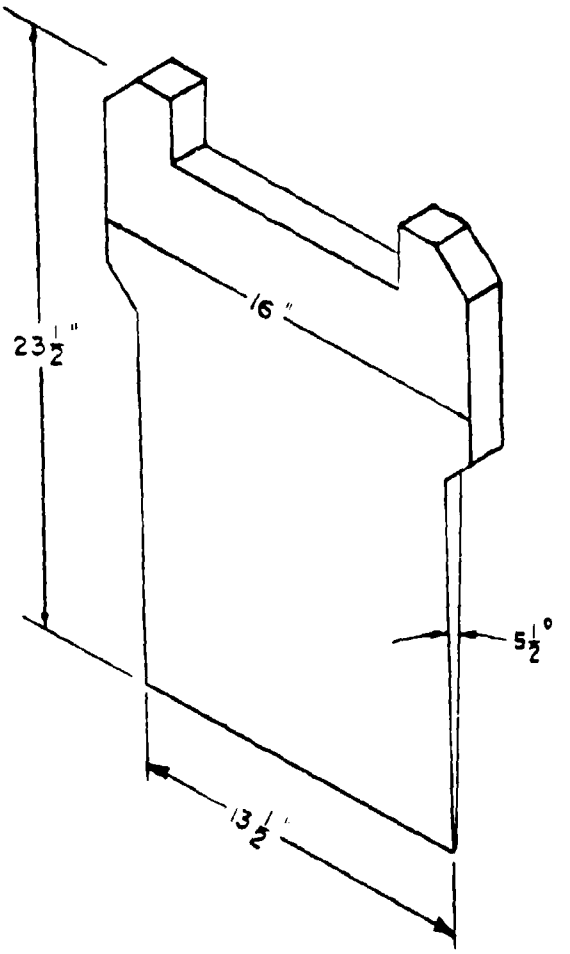

Figure 14. Seat Insert Used in the Headrest Aft Position

C. DATA ACQUISITION

Electronic data collected during the test program included impact carriage acceleration and velocity, test fixture loads and acceleration, subject head and chest acceleration, harness loads, and single-lead electrocardiograms. Detailed descriptions of the instrumentation, electronic data processing equipment, mounting procedures, and calibration techniques are provided in Appendix A. The following information summarizes the electronic instrumentation that was used to acquire the test data.

Carriage acceleration was measured using three miniature, piezoresistive accelerometers mounted to the structure of the VDT carriage. Vertical velocity was determined at the point of impact (the point where the carriage plunger contacted the water in the deceleration cylinder) by using a tachometer.

The test fixture was instrumented to measure the forces reacted into the seat, restraint, and footrest by the subject. Triaxial acceleration was measured on the seat structure to quantify the impact exposure. The seat structure included three load cells and three load links to measure the vertical and horizontal forces reacted through the structure. Forces were measured in the restraint system using strain gages bonded to the seat attachment hardware or Lebow belt load cells. Leg forces were measured by three triaxial load cells which were incorporated within the rudder pedal support structure.

Triaxial accelerometer arrays were used to measure acceleration on the head and chest of each subject. The chest accelerometer package was held tightly against the subject's sternum by a Velcro chest strap. The subject's head accelerometers were mounted on a dental bite block, which was held in the subject's mouth during the test. This technique has proven to be not only a safe means of providing intraoral/dental protection during impact, but also an effective way of minimizing movement of the accelerometer package relative to the subject's head during impact.

The electronic data obtained from the transducers described above were encoded into pulse code modulation digital format and then transmitted by telemetry to a word formatter. The word formatter reformatted the serial data into parallel data which was transmitted to a PDP 11/34 computer for recording and processing.

Photometric data were collected using two high-speed (500 frames per second), 16 mm Milliken cameras mounted on the impact carriage. One camera was mounted to the right of the subject perpendicular to the sagittal plane. The second camera was mounted above the footrest to provide a frontal view of the subject. The movements of the subject's helmet, head, shoulders, arms, and the chest accelerometer package were quantified by tracking the motion of fiducials attached to these sites. The fiducials which were attached to the subjects and to the test fixture consisted of a one-half inch diameter black circle printed on a one inch diameter white circle. The locations of the fiducials generally followed the guidelines provided in "Film Analysis Guides for Dynamic Studies of Test Subjects, Recommended Practice" (SAE J138, March 1980). More complete descriptions of the fiducial locations as well as the photometric instrumentation system are provided in Appendices A and D. Timing reference marks were recorded on the 16 mm film once every 0.01 sec. These reference marks were synchronized with the electronic instrumentation recordings.

A video camera was also used to document the tests. This camera and accompanying recorder operate at 120 frames per second with an effective shutter speed of 10 microseconds or less. Use of this system allowed the investigators to evaluate the kinematic response of each subject immediately after each test. This system is described in Appendix A.

Photographs of the test subject and equipment configuration were taken prior to each test. Items of special interest were photographed as required.

D. TEST SUBJECTS

The test dummy used for this program was an Alderson Research Laboratories, Inc., model VIP-95 dummy (serial number 124), which was designed to represent a 95th percentile (weight) adult male. The dummy was originally built for $-G_x$ automotive crash testing, based on specifications furnished to Alderson by the National Highway Traffic Safety Administration. It was designed to reproduce the head-neck response of human cadavers in forward facing impacts, but was not designed to produce meaningful response dynamics in vertical impacts. This limitation was not a critical factor in the current study, since the dummy was used only to verify the structural integrity of the test apparatus prior to human testing. The dummy's joints were adjusted to a nominal one G value, in accordance with the U.S. Department of Transportation Federal Motor Vehicle Safety Standard No. 208.

All human volunteer subjects who participated in this test program were members of the AFAMRL Impact Acceleration Stress Panel. This panel is composed of volunteer active duty Air Force members whose primary duties do not involve participation as subjects. Sixteen subjects (15 males and 1 female) were utilized during this test program. There were no special technical qualifications or training requirements for subjects. However, all subjects were qualified to participate only after successfully completing an intensive medical screening evaluation (Hearon & Raddin, 1981). This evaluation was directed by the panel physician and consisted of medical history screening, physical examination, visual acuity testing, audiometry, blood pressure measurement, routine laboratory examination (blood work and urinalysis), standard 12-lead electrocardiogram, pulmonary function tests, electroencephalogram, treadmill exercise stress test, and x-rays, including chest, skull, and complete spine films. The x-rays were reviewed by the panel physician in consultation with a radiologist (and orthopedic surgeon, as necessary) to assure elimination of individuals with disqualifying radiographic findings. The female subject had a negative pregnancy test documented and underwent a pelvic exam by a gynecologist, to assure there were no gynecologic contraindications to her participation. Relevant abnormalities in any part of the medical evaluation led to elimination of the candidate or specialty consultation and further examination, as required. Annual requalification of panel members was accomplished with a limited medical evaluation, including a physical examination and other relevant medical tests.

The generic human use protocol under which these impact tests were conducted was AFAMRL Protocol No. 80-01, "Generic Impact Acceleration Protocol, 1980". This document presented a survey of available human biodynamic test data, established broad generic exposure limits for human impact testing, and described the generic medical risks associated with such tests. Following review by the AFAMRL Human Use Review Committee (HURC) on 10 January 1980, this protocol was

recommended for approval by higher authority. Subsequently, the protocol was approved by AFAMRL/CC and, as SGO R-80-001, it was approved by USAF/SG on 7 March 1980. The specific human use protocol under which these tests were conducted was AFAMRL Protocol No. 80-23, "Evaluation of the F/FB-111 Crew Seat and Restraint System Headrest Position", which was reviewed and recommended for approval by AFAMRL/HURC on 26 June 1980 and which was subsequently approved by AFAMRL/CC. Protocol 80-23, as a specific protocol, required local consideration and approval only, in accordance with AFR 169-3, "Use of Human Subjects in Research Development, Test, and Evaluation" (February 1979).

Ongoing informed consent was provided by all subjects during the test program. Prior to testing, subjects received a thorough briefing on the experimental procedures and potential medical risks of participation. The subjects signed a witnessed consent form attesting to the fact that a detailed briefing was received and summarizing its content. Throughout the test program, the medical investigator continued to stress that any subject was free to withdraw at any time for any reason.

Table 2 is a summary of selected anthropometric values for each subject. The mean and standard deviation computed from each set of dimensions compare favorably with the mean and standard deviation of the dimensions obtained from an anthropometric survey of USAF personnel conducted in 1967 and published in AFSC Design Handbook 2-2. Forty-nine anthropometric measurements were obtained from each subject. The mean, standard deviation, and range of selected group measurements are listed in Table 3.

E. EXPERIMENT SEQUENCE

The varying parameters for each test (such as headrest position, bracing position, and restraint configuration) were provided to the test conductor and other personnel at the beginning of each day of testing. The conduct of all human exposures was the responsibility of a qualified and experienced test conductor. The test conductor directed the activities of all other personnel in the test area in accordance with a detailed checklist.

The first test of each day was done with an anthropomorphic dummy using the equipment configuration and test level planned for the first human test of the day. If no abnormalities were detected, the test personnel proceeded with preparations for tests with volunteer subjects. High-speed motion picture cameras were loaded and mounted on the test fixture. Seat vertical and footrest adjustments were made to obtain the appropriate seat configuration based upon the test plan and the anthropometry of the individual test subject. Video recording equipment was readied to permit immediate review of the test by the investigators. The accelerometer packages were then oriented in their respective reference planes and reference zero values were sampled using the data acquisition system.

Subject preparation was concurrent with preparation of the test fixture and instrumentation. Prior to each impact exposure, the subject provided a brief interval medical history and was physically examined. Emphasis was placed on neck or back symptoms, medications, abnormalities of recent sleep patterns, or recent overindulgence in food or alcoholic beverages. No subject was exposed

TABLE 2. INDIVIDUAL SUBJECT ANTHROPOMETRY SUMMARY

SUBJECT NUMBER	WEIGHT (lb)	STATURE (in)	SITTING HEIGHT (in)	MID-SHOULDER SITTING HEIGHT (in)
D-1	203	73.6	39.7	28.0
E-1	186	73.2	38.3	26.8
F-3	167	68.6	36.4	25.5
F-2	159	67.1	37.5	26.3
G-3	164	67.1	34.8	25.0
G-2	117	62.9	33.3	23.2
K-1	169	67.1	35.7	24.8
M-2	162	66.1	35.2	24.0
M-7	133	65.7	34.4	23.9
M-10	140	65.7	36.1	24.8
M-11	145	69.5	35.7	25.4
M-13	169	73.0	37.3	26.3
R-1	201	70.9	38.4	26.3
R-2	143	68.1	35.9	24.3
R-3	146	66.2	35.2	23.9
S-3	167	69.6	36.6	25.6
MEAN	161	68.4	36.3	25.3
STD DEV	23.2	3.05	1.64	1.25

TABLE 3. COLLECTIVE SUBJECT ANTHROPOMETRY SUMMARY

ANTHROPOMETRIC MEASUREMENT	MEAN	STD DEV	RANGE
Weight	161	23.2	117 - 203
Stature	68.4	3.05	62.9 - 73.6
Cervicale Height	58.7	2.87	55.5 - 63.8
Trochanteric Height	35.8	2.21	32.3 - 39.9
Tibiale Height	17.5	1.04	15.8 - 19.5
Chest Circumference	37.6	1.38	35.6 - 40.0
Waist Circumference	33.5	2.75	29.6 - 39.0
Buttock Circumference	37.9	2.43	33.7 - 42.9
Acromion-Radiale Length	12.7	0.62	11.7 - 13.7
Radiale-Stylion Length	10.3	0.72	8.5 - 11.3
Sitting Height	36.3	1.64	33.3 - 39.7
Mid-Shoulder Sitting Height	25.3	1.25	23.2 - 28.0
Buttock-Knee Length	23.7	1.18	21.9 - 26.3
Knee Height, Sitting	21.3	1.30	19.6 - 23.5
Head Length	7.7	0.26	7.2 - 8.2
Head Breadth	6.0	0.18	5.6 - 6.4
Head Circumference	22.4	0.59	21.5 - 23.3
Hip Breadth, Sitting	14.3	0.88	12.5 - 15.7

with symptoms which may have obscured detection of test-related injury or which may have indicated predisposition to such injury.

All subjects wore orange, cut-off, long underwear to allow mounting of camera targets and instrumentation. Male subjects wore athletic supporters. The female subject wore a bathing suit. Each subject was instructed to void prior to entering the test area.

A disposable dental bite block (made of Optosil placed over a stainless steel frame) was molded for the subject prior to each impact test. An electrically-isolated accelerometer array was then mounted on the metal frame of the bite block. During this test program, the metal frame was modified with a metal arm which extended from the mouth of the subject to permit the mounting of a photometric target on a styrofoam block. This modification was implemented to permit more precise quantification of subject head displacement and to directly couple the electronic and photometric data obtained during the impact. The modified metal frame was utilized primarily during tests in cells E and F of the experimental matrix.

The medical instrumentation of each subject was standardized as follows. Three stick-on EKG electrodes were placed on the subject, one on the upper posterior aspect of each arm and a third on the right lateral chest, sixth intercostal space, mid-axillary line. The snap-on lead from each of these electrodes was plugged into a telemetry transmitter, which, in turn, was strapped to the left upper extremity of the subject. Continuous remote transmission of a single-lead EKG to a portable EKG machine located near the VDT was assured prior to each impact. Sitting and standing tracings were obtained immediately pre-impact (and post-impact) and a continuous tracing was obtained during test countdown and impact. Coincident with EKG recording, pretest (and post-test) sitting and standing blood pressure determinations were made for each subject by the medical technician using a sphygmomanometer. These pressures were recorded on the appropriate EKG tracing.

The subject was then fitted with the appropriate size USAF HGU-26/P flight helmet. After mounting the test fixture platform, the subject was asked to exhale and the chest accelerometer array was secured against his chest with a Velcro strap. The subject was then seated in the proper, upright position and the restraint harness was fitted and tightened. The F/FB-111 harness was fitted according to the procedure described in the F/FB-111 Technical Order. The shoulder straps were pre-tensioned to 14 ± 5 lb and the lap belt straps were pretensioned to 20 ± 5 lb. Stick-on photometric targets were placed on the subject at pre-determined locations (see Appendix D) and the positions of these targets relative to one another and to targets mounted on the test fixture were measured. Finally, the shoulder strap angles (relative to a reference horizontal) were measured.

The final pretest activity consisted of documentation of the test configuration by still photographs, measurement of subject blood pressure, evaluation of the electrocardiographic tracing by the medical monitor, and final safety checks of the test equipment and facility by the designated safety monitor. The test carriage was then elevated to an intermediate height while the water brake was filled with water. Finally, the carriage was raised to the specified drop height and the subject was directed to assume the specified upper extremity

bracing position. The test area was cleared, a countdown was initiated, and the carriage was allowed to fall onto the water brake to produce the desired impact.

The subject was provided with a foot switch which was connected to the control system of the VDT in such a way that the carriage could not be released unless the switch was depressed. In this manner, the subject was required to consciously provide his ongoing informed consent throughout the immediate pre-impact period (including the countdown) until carriage release, in order for the test to proceed. After carriage release, of course, it was no longer possible to abort the test.

A physician monitor, who was responsible for assuring subject safety during testing, was present for each test and reserved the right to cancel any test at any time for any reason. Such reasons may have included a recent history of neck or back strain, pretest pre-syncope, pretest arrhythmia, or any other condition of the subject, equipment, or procedure which was deemed by the monitor to place the subject at undue risk. The medical monitor was provided a finger-operated switch similar in function to the subject's switch. It had to be depressed prior to carriage release in order for the test to proceed. Agreement of both the subject and the medical monitor that the test should proceed was thus assured.

During testing, an ambulance crew was alerted and standing by within one-half mile of the test facility. In addition, emergency medical equipment was arranged in the test area for use by the physician monitor in the event of an emergency. This equipment included a defibrillator, oxygen equipment, intubation equipment, IV solutions and equipment, appropriate emergency drugs, backboard, harness cutters, and bandages.

Following the impact exposure, the subject was released from the harness. The physician monitor assured that the subject was uninjured. Post-test blood pressures and EKG (single-lead) were obtained and a brief post-test physical examination was accomplished. The subject was then provided with contacts to obtain later medical care as required or to ask questions relating to his participation. Impact exposures for each subject occurred no more frequently than once in any five-day period to allow time for detection of any occult injury.

The tests conducted at the experimental level in cells A, B, C, and D were randomized for each subject. After completing those 4 exposures, the subject was exposed in test condition E and then in test condition F. It was not practical to randomize cells E and F with the other cells due to the time required to change from the F/FB-111 harness to the conventional harness.

Two deviations from the test plan are noteworthy. First, the electronic data was lost in test #313, an 8 G orientation test in cell C for subject K1. This occurred due to a malfunction in the data acquisition system. This exposure was repeated for the subject as test #341. Second, subject R2 was inadvertently exposed to the same test conditions twice (test #347 and test #359). One of the two tests (test #359) was randomly selected for use in data analysis.

SECTION 4

TEST RESULTS AND ANALYSIS

A. OVERVIEW

The electronically measured and computed data obtained in this test program are summarized in Table B-1 in Appendix B. This table presents the arithmetic mean and standard deviation of each parameter in each cell of the experimental matrix. Typical analog data sets from each cell of the matrix and data summaries of each test at the experimental level are also presented in Appendix B.

A statistical analysis of these electronic test results was performed using the Wilcoxon paired-replicate rank test. The means and standard deviations of each parameter in each comparison are summarized in Tables C-1 through C-7 in Appendix C. Statistically significant trends in the measured and computed response parameters for each comparison are summarized in Tables 5, 10, and 12. In these tables, the arrow designates a statistically significant change in a parameter at the 90% confidence level for a two-tailed test. The arrow also indicates the direction of the trend from the cell smaller in magnitude. The number indicates the percentage increase in the parameter means. Wilcoxon computations from each parameter comparison yielding a statistically significant result are also presented in Appendix C.

The impact test conditions were controlled by using the same carriage plunger for all tests and by maintaining a constant drop height for all tests done at a specified test level. A drop height of 8.5 feet corresponded to an 8 G orientation exposure and a drop height of 11.0 feet corresponded to a test at the 10 G experimental level. All subjects experienced 8 G orientation tests in the C and D test conditions prior to participating in tests at the experimental level. Orientation tests were conducted principally to familiarize subjects with test procedures. The means and standard deviations of carriage acceleration, seat acceleration, and carriage velocity change for each cell of the experimental matrix are indicated in Table B-1 (Appendix B). During this test program, the peak carriage acceleration ranged from 10.3 G to 11.0 G, the peak seat acceleration ranged from 10.1 G to 11.0 G, and the carriage velocity change ranged from 25.3 ft/sec to 26.0 ft/sec.

The Wilcoxon analyses of these parameters revealed statistically significant differences in the peak seat acceleration in comparison C-D (Table 5) and the carriage velocity change in comparison A-C (Table 7). These differences in impact test conditions, attributable to variations in rail friction on the VDT, represented, at most, a 1% increase in the measured parameter. These small variations in test conditions do not appear to have biased the trends of the other measured parameters.

Two noteworthy modifications of the electronic data were made during data processing. Tare tests of the fixture were performed in order to assess the influence of the seat pan and footrest weights on the supporting load cells. Then, the product of the weight on each load cell and the instantaneous carriage acceleration was subtracted from the load cell data acquired during the human tests. In this manner, the recorded data was corrected for the seat pan and footrest weights. Second, the head acceleration data were correlated with the photometric data in order to assess the influence of subject headstrikes on the

headrest during the rebound phase of the impact. Acceleration spikes, particularly in the +X axis, at times exceeded the peak head acceleration recorded during the initial response phase. When this occurred, the electronic data base was modified by removing the late spike so that the recorded maximum was that which occurred during the initial impact response phase. In this way, it was assured that only initial impact response values were compared in the statistical analysis.

The photometric data analysis was limited to the data collected from the lateral camera mounted on the test fixture. The analysis, therefore, assumed that subject motion would be primarily in the X-Z plane. The maximum horizontal and vertical head displacements of subjects were obained by tracking helmet-mounted and subject-mounted (on the cheek, e.g.) fiducials during the impact. The locations of these fiducials are specified in Figures D-1 and D-2 in Appendix D. Maximum head displacement data, summarized in Table D-1, could not be obtained for all tests in this series due to difficulties encountered in tracking fiducials during the photometric data processing. Problems in this area were related to the photometric targets becoming obscured by a portion of the test fixture or being washed out by the lighting in the impact area. Typical photometric data obtained during this test program are also presented in Appendix D.

Wilcoxon analyses of the maximum horizontal and vertical head displacements obtained at comparable target locations in comparable tests were performed. Summaries of these data are provided in the body of this report in Tables 4, 9, and 11. In these Tables, the asterisk indicates a statistically significant trend at the 90% confidence level and the number indicates the percent increase in the parameter means. The arrow indicates the direction of the trend.

B. HEADREST POSITION EFFECTS

The influence of fore-aft headrest adjustment on human impact response was assessed in comparisons A-B, C-D, and E-F. The experimental test conditions are defined in Table 1 and the fore and aft headrest adjustments are shown in Figures 1 and 3. The Wilcoxon comparisons of the pertinent photometric and electronic data are shown in Tables 4 and 5.

Analysis of the photometric data revealed that the maximum horizontal head displacement increases with the headrest at the forward adjustment, regardless of subject bracing and restraint configuration. The maximum vertical head displacement measured at the helmet decreases with the headrest in the forward position, whereas the maximum vertical displacement measured at the cheek increases with the headrest in the forward position. The latter findings were statistically significant in comparisons A-B and E-F, but were not significant in comparison C-D, although the trends were in the same direction. These findings (Table 4) are consistent with the interpretation of increased forward and downward head rotation with the headrest in the forward position.

A number of observations based on a review of the high-speed films may be made. Several subjects, including E1, F3, and G3, had difficulty placing their helmeted heads against the headrest in the aft position without some degree of extension of the cervical spine. It is not known whether or not this difficulty may be correlated with subject anthropometry. Also, it was possible to categorize the head motion of subjects during impact into five types, as summarized

TABLE 4

PHOTOMETRIC DATA:

SUMMARY OF STATISTICALLY SIGNIFICANT TRENDS FROM THE WILCOXON COMPARISONS AND PERCENT INCREASE IN PARAMETER MEANS

MATRIX CELL	A		B	C		D	E		F
RESTRAINT HARNESS	F-111		F-111	F-111		F-111	Conv		Conv
BRACING POSITION	Knees		Knees	Lap		Lap	Lap		Lap
HEADREST POSITION	Forw		Aft	Forw		Aft	Forw		Aft
	(n = 10)			(n = 6)			(n = 8)		
HORIZONTAL DISPLACEMENT									
UPPER HELMET	127	<---	*	93	<---	*	106	<---	*
LOWER HELMET	65	<---	*	82	<---	*	39	<---	*
CHEEK	76	<---	*	66	<---	*	49	<---	*
VERTICAL DISPLACEMENT									
UPPER HELMET	*	--->	12		--->	3	*	--->	23
LOWER HELMET	*	--->	10		--->	11		--->	11
CHEEK	15	<---	*	31	<---		*	<---	17

This table summarizes the results of three separate comparisons of photometric data (A-B, C-D, and E-F) by means of the Wilcoxon paired-replicate rank test. The 90% confidence level for a two-tailed test was chosen as the level of statistical significance. An arrow designates a trend or change in a parameter between two test conditions and also indicates the direction of the trend from the smaller to the larger parameter mean. The number indicates the percentage increase in the parameter means. A statistically significant trend is indicated by an asterisk.

TABLE 5

ELECTRONIC DATA:

SUMMARY OF STATISTICALLY SIGNIFICANT TRENDS FROM THE WILCOXON COMPARISONS AND PERCENT INCREASE IN PARAMETER MEANS

MATRIX CELL	A	B	C	D	E	F
RESTRAINT HARNESS	F-111	F-111	F-111	F-111	Conv	Conv
BRACING POSITION	Knees	Knees	Lap	Lap	Lap	Lap
HEADREST POSITION	Forw	Aft	Forw	Aft	Forw	Aft
	(n = 14)		(n = 13)		(n = 12)	
CARRIAGE ACCELERATION			---> 1			
CARRIAGE VELOCITY						
SEAT ACCELERATION						
CHEST ACCELERATION						
-X axis						
+X axis					---> 27	
+Z axis						
Resultant						
CHEST SEVERITY INDEX	---> 10					
HEAD ACCELERATION						
-X axis	130 <---		136 <---		68 <---	
+X axis	---> 89		---> 114			
+Z axis			5 <---			
Resultant						
HEAD SEVERITY INDEX					---> 9	
STRAP LOADS						
Reflection Straps					†	
Inertia Reel Straps	17 <---				†	
Total Shoulder Straps						
Total Lap Belt						
Crotch Strap					†	
SEAT PAN LOADS						
-X axis			8 <---			
+Z axis						
Resultant						
FOOTREST LOADS						
-X axis						
+Z axis						
Resultant				---> 10		

SEE APPENDIX C — Table C-1 — Table C-2 — Table C-3

This table summarizes the results of three separate comparisons of electronic data (A-B, C-D, and E-F) by means of the Wilcoxon paired-replicate rank test. The 90% confidence level for a two-tailed test was chosen as the level of statistical significance. An arrow designates a statistically significant trend or change in a parameter mean between two test conditions and also indicates the direction of the trend from the smaller to the larger parameter mean. The number indicates the percentage increase in the parameter means. The actual means used to compute these percentages are listed in Tables C-1, C-2, and C-3 in Appendix C. A dagger (†) indicates that no comparison was possible, since the conventional harness does not have reflection straps or a crotch strap.

TABLE 6

CLASSIFICATION OF TYPES OF HEAD MOTION

DESCRIPTION OF HEAD MOTION	HEADREST POSITION	
	2 1/4" FORWARD (CELLS A, C, E)	1" AFT (CELLS B, D, F)
	(n = 37)	(n = 39)
Forward and Downward Rotation	17	2
Forward Translation	5	3
No Significant Movement	4	5
Forward Translation, then Rearward Rotation	8	8
Rearward Rotation	3	21

Total n = 76, since photometric data was not available for all tests.

in Table 6. Cervical spine flexion presumably occurred when there was either forward and downward head rotation or forward translation of the head. On the other hand, cervical spine extension presumably occurred when there was either forward translation followed by rearward rotation of the head or only rearward rotation of the head. Grouping the responses in this way allows application of the Yates chi-square test to evaluate the correlation between cervical spine flexion or extension and headrest position. A pertinent 2 X 2 contingency table is shown in Table 7. Assuming equivalent populations and a standard confidence limit, $\alpha = 0.05$, the null hypothesis that the rate of cervical spine flexion with the headrest forward is not increased can be rejected. The 2 X 2 contingency shown in Table 8 may also be derived from the data provided in Table 6. Applying the same assumptions, in this case, the null hypothesis that the rate of cervical spine extension with the headrest aft is not increased can be rejected. These correlations between forward adjustment and flexion and between aft adjustment and extension are consistent with the results of analysis of the digitized photometric data presented above.

The head acceleration findings are summarized in Table 5. There was a small but statistically significant increase in the vertical head acceleration with the headrest in the forward position in the C-D comparison. Relatively large statistically significant increases in head acceleration measured along the -X axis were found with the headrest forward in all three comparisons. As indicated in Section 2B, the -X head acceleration measurement is actually a reflection of vertical head acceleration due to the forward rotation of the head during impact. In addition, statistically significant increases in +X axis head acceleration were observed with the headrest aft. In comparison A-B, this increase was 89% and, in comparison C-D, this increase was 114%. No statistically significant trends were observed in resultant head acceleration.

These acceleration findings are consistent with the aforementioned photometric data. With the headrest 1 inch aft of the plane of the seat back, subject head motion is primarily translational, as evidenced by increased acceleration in the +X axis. With the headrest 2 1/4 inches forward of the plane of the seat back, subject head motion is primarily rotational, as evidenced by increased head acceleration in the -X axis (which reflects a vertical component of acceleration). These acceleration findings are strong enough to be significant at the 95% confidence level for the two-tailed test. Furthermore, since these

TABLE 7

CERVICAL SPINE FLEXION
AS A FUNCTION OF HEADREST POSITION

		HEADREST 2¾" FORWARD	
		NO	YES
CERVICAL SPINE FLEXION	NO	34	15
	YES	5	22

TABLE 8

CERVICAL SPINE EXTENSION
AS A FUNCTION OF HEADREST POSITION

		HEADREST 1" AFT	
		NO	YES
CERVICAL SPINE EXTENSION	NO	26	10
	YES	11	29

trends in head acceleration components are in opposite directions, their effects are counterbalancing as evidenced by the absence of statistically significant changes in resultant head acceleration.

The practical significance of the few other statistically significant trends in these three headrest position comparisons is questionable. There were no consistent statistically significant trends in other parameters in all three comparisons. The absence of statistically significant changes in vertical and resultant seat loads indicates that adjustments in headrest position did not influence the magnitude of the total vertebral column loading during vertical impacts.

C. UPPER EXTREMITY BRACING EFFECTS

The influence on human impact response of upper extremity bracing was assessed in comparisons A-C and B-D. The hands-on-knees position (Figure 4) was compared to a position in which the hands were relaxed in the lap to preclude upper extremity bracing (Figure 5). The Wilcoxon comparisons of the pertinent photometric and electronic data are shown in Tables 9 and 10.

Analysis of the digitized photometric data revealed that the maximum horizontal and vertical displacements of the head were increased in the hands-in-lap position compared to the hands-on-knees position. As shown in Table 9, the statistically significant increases in head displacement were found in the

TABLE 9

PHOTOMETRIC DATA:

SUMMARY OF STATISTICALLY SIGNIFICANT TRENDS FROM THE WILCOXON COMPARISONS AND PERCENT INCREASE IN PARAMETER MEANS

MATRIX CELL RESTRAINT HARNESS BRACING POSITION HEADREST POSITION	A F-111 Knees Forw	C F-111 Lap Forw	B F-111 Knees Aft	D F-111 Lap Aft
	(n = 7)		(n = 10)	
HORIZONTAL DISPLACEMENT				
UPPER HELMET	--->	80	* --->	68
LOWER HELMET	--->	59	--->	31
CHEEK	--->	41	--->	32
VERTICAL DISPLACEMENT				
UPPER HELMET	--->	11	--->	10
LOWER HELMET	--->	2	* --->	11
CHEEK	--->	27	* --->	12

This table summarizes the results of two separate comparisons of photometric data (A-C and B-D) by means of the Wilcoxon paired-replicate rank test. The 90% confidence level for a two-tailed test was chosen as the level of statistical significance. An arrow designates a trend or change in a parameter between two test conditions and also indicates the direction of the trend from the smaller to the larger parameter mean. The number indicates the percentage increase in the parameter means. A statistically significant trend is indicated by an asterisk.

TABLE 10

ELECTRONIC DATA:

SUMMARY OF STATISTICALLY SIGNIFICANT TRENDS FROM THE WILCOXON COMPARISONS AND PERCENT INCREASE IN PARAMETER MEANS

MATRIX CELL	A	C	B	D
RESTRAINT HARNESS	F-111	F-111	F-111	F-111
BRACING POSITION	Knees	Lap	Knees	Lap
HEADREST POSITION	Forw	Forw	Aft	Aft
	(n = 14)		(n = 13)	
CARRIAGE ACCELERATION				
CARRIAGE VELOCITY	---> 0.4			
SEAT ACCELERATION				
CHEST ACCELERATION				
-X axis	---> 33		---> 36	
+X axis				
+Z axis	---> 9			
Resultant				
CHEST SEVERITY INDEX	---> 13			
HEAD ACCELERATION				
-X axis				
+X axis				
+Z axis			4 <---	
Resultant			4 <---	
HEAD SEVERITY INDEX				
STRAP LOADS				
Reflection Straps			---> 18	
Inertia Reel Straps	---> 18		---> 31	
Total Shoulder Straps			---> 28	
Total Lap Belt				
Crotch Strap				
SEAT PAN LOADS				
-X axis	---> 8			
+Z axis	---> 5		---> 4	
Resultant	---> 6		---> 4	
FOOTREST LOADS				
-X axis	39 <---		30 <---	
+Z axis	16 <---		13 <---	
Resultant	29 <---		21 <---	
SEE APPENDIX C	Table C-4		Table C-5	

This table summarizes the results of two separate comparisons of electronic data (A-C and B-D) by means of the Wilcoxon paired-replicate rank test. The 90% confidence level for a two-tailed test was chosen as the level of statistical significance. An arrow designates a statistically significant trend or change in a parameter mean between two test conditions and also indicates the direction of the trend from the smaller to the larger parameter mean. The number indicates the percentage increase in the parameter means. The actual means used to compute these percentages are listed in Tables C-4 and C-5 in Appendix C.

B-D comparison only. In both comparisons, the increases in maximum horizontal head displacement were relatively larger than the increases in maximum vertical head displacement.

Analysis of the head acceleration data revealed no statistically significant changes in the A-C comparison. (See Table 10.) However, in the B-D comparison, a relatively small (4%) increase in vertical and resultant head acceleration was observed in the hands-on-knees position. These findings are consistent with the relatively smaller head displacements in the hands-on-knees position observed in the photometric data. The head acceleration findings are certainly attributable to the use of upper extremity bracing, but, in this study, they are observed for the aft headrest adjustment only.

Statistically significant increases in the -X axis chest acceleration (toward the seat back) were observed for the hands-in-lap position in both comparisons A-C and B-D. With the headrest forward (i.e., in the A-C comparison) statistically significant increases in vertical chest acceleration and the chest Severity Index were also observed for the hands-in-lap position. The latter findings, however, were not significant at the 95% confidence level. These findings are consistent with the intended purpose of the hands-on-knees bracing posture, which includes stabilization of the upper torso during impact.

The statistically significant increases in shoulder strap loads in the hands-in-lap position suggest a greater inertial response of the upper torso compared to the hands-on-knees position. These findings are stronger with the headrest aft (in the B-D comparison), being significant at the 95% confidence level. No changes in lap belt or crotch strap loads were observed as a function of upper extremity bracing.

The vertical and resultant seat loads were increased in the hands-in-lap position compared to the hands-on-knees position, regardless of headrest position. Although the magnitudes of these changes are relatively small, their practical significance is of considerable importance. This is true because seat loads represent the best indirect measurement of vertebral column loading during impact. The significance of these findings will be further discussed in Section 5 of this report.

In both comparisons, statistically significant increases in the horizontal, vertical, and resultant footrest loads were seen in the hands-on-knees position compared to the hands-in-lap position. These trends are related to the seat load trends, which are in the opposite direction. The tandem footrest and seat load findings are consistent with the intended purpose of the hands-on-knees brace. Using this bracing technique, force is carried through the upper and lower extremities to the footrest as the seat is unloaded.

D. RESTRAINT CONFIGURATION EFFECTS

The influence on human impact response of the restraint harness configuration was assessed in comparisons C-E and D-F. The proposed, modified F/FB-111 restraint configuration (Figure 6) and a standard or conventional double shoulder strap - lap belt configuration (Figure 7) were compared. The Wilcoxon comparisons of the photometric and electronic data are summarized in Tables 11 and 12.

Analysis of the photometric data revealed a statistically significant increase in maximum horizontal head displacement measured at the low helmet fiducial in the conventional harness compared to the F/FB-111 harness with the headrest aft (comparison D-F). Also, statistically signficant increases up to 31% were seen in maximum vertical head displacement measured at the helmet and cheek fiducials in the conventional harness compared to the F/FB-111 harness in the D-F comparison. No statistically significant changes were seen with the headrest in the forward adjustment location (C-E comparison). Therefore, the statistically significant trends in the photometric data indicated that higher head displacements, particularly in the vertical direction, were experienced in the conventional harness.

However, the electronic data (Table 12) revealed statistically significant increases in vertical and resultant head acceleration in the conventional harness compared to the F/FB-111 harness in both comparisons C-E and D-F. Similar statistically signifiant trends were found in the head Severity Index. These findings are consistent with the interpretation of degraded performance in the conventional harness.

In comparison D-F, statistically signficant increases in +X chest acceleration and the chest Severity Index were observed in the conventional harness compared to the F/FB-111 harness. These findings are also indicative of degraded performance in the conventional harness with the headrest in the aft position. In the C-E comparison, it was interesting to observe a statistically significant increase in chest Severity Index, while the mean resultant chest acceleration was actually larger in the C condition than in the E condition. Since the chest Severity Index is a function of the area beneath the chest resultant - time curve, in the absence of higher peak accelerations in the conventional harness, the measured duration of the chest acceleration response must be greater in the conventional harness. Inspection of the data revealed that this in fact was the case.

Statistically significant increases in the shoulder strap loads by an average of 44% were seen in the F/FB-111 harness. On the other hand, statistically significant increases in the lap belt loads (21%) were observed in the conventional harness. These findings, which were independent of headrest position, indicate that loads are carried very differently in the two harnesses. This is probably related to the unique geometry of the F/FB-111 harness shoulder straps and the presence of the crotch strap.

TABLE 11

PHOTOMETRIC DATA:

SUMMARY OF STATISTICALLY SIGNIFICANT TRENDS FROM THE WILCOXON COMPARISONS AND PERCENT INCREASE IN PARAMETER MEANS

MATRIX CELL RESTRAINT HARNESS BRACING POSITION HEADREST POSITION	C F-111 Lap Forw	E Conv Lap Forw	D F-111 Lap Aft	F Conv Lap Aft
	(n = 6)		(n = 9)	
HORIZONTAL DISPLACEMENT				
UPPER HELMET	33 <---		10 <---	
LOWER HELMET	36 <---		* --->	21
CHEEK	24 <---		--->	8
VERTICAL DISPLACEMENT				
UPPER HELMET	--->	21	* --->	31
LOWER HELMET	--->	21	* --->	23
CHEEK	0		* --->	12

This table summarizes the results of two separate comparisons of photometric data (C-E and D-F) by means of the Wilcoxon paired-replicate rank test. The 90% confidence level for a two-tailed test was chosen as the level of statistical significance. An arrow designates a trend or change in a parameter between two test conditions and also indicates the direction of the trend from the smaller to the larger parameter mean. The number indicates the percentage increase in the parameter means. A statistically significant trend is indicated by an asterisk.

TABLE 12

ELECTRONIC DATA:

SUMMARY OF STATISTICALLY SIGNIFICANT TRENDS FROM THE WILCOXON COMPARISONS AND PERCENT INCREASE IN PARAMETER MEANS

MATRIX CELL RESTRAINT HARNESS BRACING POSITION HEADREST POSITION	C F-111 Lap Forw	E Conv Lap Forw	D F-111 Lap Aft	F Conv Lap Aft
	(n = 13)		(n = 12)	
CARRIAGE ACCELERATION				
CARRIAGE VELOCITY				
SEAT ACCELERATION				
CHEST ACCELERATION				
-X axis				
+X axis			--->	34
+Z axis				
Resultant				
CHEST SEVERITY INDEX	--->	16	--->	26
HEAD ACCELERATION				
-X axis	10 <---			
+X axis				
+Z axis	--->	11	--->	16
Resultant	--->	12	--->	15
HEAD SEVERITY INDEX	--->	24	--->	32
STRAP LOADS				
Reflection Straps	†		†	
Inertia Reel Straps	†		†	
Total Shoulder Straps	40 <---		48 <---	
Total Lap Belt	--->	21	--->	21
Crotch Strap	†		†	
SEAT PAN LOADS				
-X axis	--->	12	--->	15
+Z axis	--->	6	--->	5
Resultant	--->	6	--->	6
FOOTREST LOADS				
-X axis	--->	18		
+Z axis	--->	5		
Resultant	--->	15		
SEE APPENDIX C	Table C-6		Table C-7	

This table summarizes the results of two separate comparisons of electronic data (C-E and D-F) by means of the Wilcoxon paired-replicate rank test. The 90% confidence level for a two-tailed test was chosen as the level of statistical significance. An arrow designates a statistically significant trend or change in a parameter mean between two test conditions and also indicates the direction of the trend from the smaller to the larger parameter mean. The number indicates the percentage increase in the parameter means. The actual means used to compute these percentages are listed in Tables C-6 and C-7 in Appendix C. A dagger (†) indicates that no comparison was possible, since the F/FB-111 harness has reflection straps and a crotch strap and the conventional harness does not.

In both comparisons C-E and D-F, statistically signficant increases in seat loads were found in the conventional harness compared to the F/FB-111 harness. The increase in the resultant seat load was 6% in both comparisons. These findings are indicative of increased vertebral column loading in the conventional harness and are, therefore, consistent with the interpretation of degraded impact protection in the conventional harness.

Horizontal, vertical, and resultant footrest loads were significantly increased in the conventional harness in the C-E comparison only. Although these findings must be a function of the restraint configuration, the absence of similar findings in the D-F comparison suggest that they may also be related to the forward position of the headrest as well.

Except for the vertical footrest load finding, all trends in both the C-E and D-F comparisons were statistically significant at the 95% confidence level.

E. MEDICAL FINDINGS

The subjective and objective medical findings from this test program are summarized in Table 13. The relatively large number of subjects experiencing cervical pain at the time of impact in test condition F is noteworthy. All six of these subjects experienced some degree of cervical spine extension during the impact. As previously noted, there was a strong correlation between aft headrest adjustment and the tendency for cervical spine extension. This tendency was particularly strong in test condition F, probably due to the relatively poor upper torso restraint provided by the conventional harness and the subjects' efforts to brace helmeted head on the headrest. At this writing, three of the six subjects who experienced cervical pain in this test condition have voluntarily terminated their participation in impact acceleration stress experiments. The termination spine x-rays of these subjects were within normal limits.

TABLE 13

SUMMARY OF SUBJECTIVE AND OBJECTIVE MEDICAL FINDINGS

	TEST LEVEL (CELL OF MATRIX)		
MEDICAL FINDING	8G (C,D)	10G (A-E)	10G (F)
	(n = 33)	(n = 70)	(n = 12)
Cervical Pain	0	4	6
Paresthesias	4	0	1
Abrasions	0	0	1
Contusions	0	1	0
Muscle Strains	2	1	0

Subject attrition during this test program was not unusual. Two of the sixteen subjects who participated in the program, E1 and M7, were disqualified from further participation as a result of presumed muscle strains. Subject M7 incurred a mid-thoracic paravertebral muscle strain during an 8 G impact in test condition D. Since the subject had planned to voluntarily terminate his participation six weeks from that time, he was disqualified from further participation. Subject E1 incurred a moderately severe paracervical muscle

strain during a 10 G test in test condition D. Post-injury cervical spine films were negative for fracture, but the subject was disqualified from further participation when his injury did not promptly resolve. In retrospect, both of these subjects, in addition to subjects D1, F3, and G3, by virtue of having rounded shoulders, had difficulty placing their heads on the headrest in the aft position.

None of the adverse medical effects described above were believed to have any long-term clinical significance. The impact test conditions investigated in this study were believed to be well within human tolerance.

SECTION 5

DISCUSSION

A. HEADREST POSITION EFFECTS

Adjustment of the headrest 2 1/4 inches forward of the plane of the seat back causes an increase in forward and downward head rotation. This is evidenced by an increase in maximum horizontal head displacement, an increase in maximum vertical head displacement measured at the cheek, and a decrease in maximum vertical displacement measured at the helmet. The increase in head rotation is also evidenced by an increase in head acceleration in the -X axis. Adjusting the headrest 1 inch aft of the plane of the seat back is associated with, in many cases, forward translation of the head and extension of the cervical spine. The forward translation is evidenced by an increase in head acceleration in the +X axis. Extension of the cervical spine was noted particularly in test condition F and was presumably due to the relatively ineffective upper torso restraint provided by the shoulder straps. These findings are summarized in Tables 4 and 5.

The similarity between these test results and the findings of previous human impact tests conducted nearly 40 years ago is remarkable. Savely and Ames (1946, 1948) conducted a test program using a T-2 catapult on a 30-foot ejection tower. Vacuum tube accelerometers were used to measure accelerations. These investigators observed that the location of the center of gravity of the head prior to a vertical impact is apparently responsible for the degree and the direction of neck bending during the event. It was presumed that this neck bending was due to the fore-aft position of the headrest. In the initial studies, since the fore-aft position of the headrest was not adjusted, the position of the head relative to the seat back plane was determined by the "conformation" of the subject. A subject with rounded shoulders found it necessary to extend his neck in order to place his head on the headrest. In subsequent human impact tests, the fore-aft position of the headrest was varied through a range of 2 inches from 1/4 inch to 2 1/4 inches aft of the seat back plane. Neck flexion was noted if the headrest was too far forward and extension was noted if the headrest was too far aft. The proper headrest adjustment to prevent either flexion or extension was found to vary from subject to subject. Only neck muscle strains were noted as adverse medical effects in this test series.

The cervical spine fractures and dislocations incurred operationally in open ejection seats from January 1971 to December 1978 was recently summarized (Kazarian et al., 1980). These accident investigation data were provided by the Air Force Inspection and Safety Center. During the eight-year period evaluated there were 595 ejections. Eleven major injuries and six fatal injuries were the result of cervical spine trauma. Five of the nonfatal injuries were attributed to ejection force, all occurred in the C_5-C_7 range, and all were assigned a hyperflexion injury mechanism. Seven major or fatal injuries were believed to have been caused by a hyperextension injury mechanism. Five of these were presumed to have been caused by aerodynamic forces (windblast), one was presumably caused by parachute opening shock, and another was of unknown etiology. If these data are accurate, it would appear that bony cervical injuries have not occurred as the result of hyperextension during ejection. This may be true because the headrest, regardless of fore-aft adjustment, effectively limits the

amount of cervical extension possible during vertical impact. These operational ejection data were not correlated with fore-aft headrest position.

In addition to these bony injuries, a variety of soft tissue cervical injuries undoubtedly occurred during this operational ejection experience. Hyperflexion of the cervical spine may cause injury to the posterior ligamentous structures, such as the posterior longitudinal ligament, the ligamentum flavum, and the interspinous and supraspinous ligaments. Hyperextension of the cervical spine may cause injury to the anterior ligamentous structures, such as the anterior longitudinal ligament. Tears of the anterior longitudinal ligament as a result of hyperextension injuries are often evidenced by anteroinferior avulsion fractures of the involved vertebral body (Burke, 1971). Anterosuperior chip fractures of the cervical vertebral bodies are generally the result of hyperflexion injury (Dolan, 1977).

In the present study, adjusting the headrest 1 inch aft of the plane of the seat back apparently predisposed subjects to cervical extension during impact. This assertion has been substantiated by the Yates chi-square analysis in Section 4B. A worrisome finding was that nine of the ten subjects reporting cervical pain during impacts in this test series experienced some degree of cervical extension during the event. The headrest was adjusted aft in nine of these same ten cases. Two subjects (E1 and M7), for whom the soft tissue injury threshold was exceeded, also experienced cervical extension during the impact. Subjects with rounded shoulders found it necessary to slightly extend the neck in order to reach the headrest in the aft adjustment position. In view of all these findings, it is apparent that, for some subjects, adjustment of the headrest 1 inch aft of the plane of the seat back places the seat back too far aft.

On the other hand, adjusting the headrest 2 1/4 inches forward of the plane of the seat back apparently does increase the forward and downward rotation of the head. Such a forward headrest location is also detrimental to rearward visibility in high-performance, fighter aircraft. Although the threshold for cervical injury may be higher in flexion than in extension, the basic principles of impact protection dictate that head displacement and acceleration be minimized in order to reduce the probability of injury. The forward headrest location investigated in this study would not be consistent with the goal of minimizing head displacement and acceleration.

The optimal fore-aft headrest adjustment may vary from subject to subject. However, if the fore-aft headrest location must be fixed, an adjustment between the two extremes investigated in this study may be indicated to minimize head acceleration and the potential for extension or flexion of the cervical spine. Therefore, further vertical impact tests with human subjects at various fore-aft headrest adjustments between the extremes investigated in this study are recommended to clarify this issue.

B. UPPER EXTREMITY BRACING EFFECTS

Human response to vertical impact in the hands-on-knees position was compared to human response in the hands-in-lap position. Use of the hands-on-knees position produced significant decreases in -X chest acceleration and vertical and resultant seat loads as well as significant increases in footrest loads. These findings, summarized in Table 10, are consistent with the intended purpose of the hands-on-knees brace, which is to create alternate pathways to transmit loads. In this position, greater loads are carried through the extremities to the footrest and the vertebral column is unloaded. The increased vertical and resultant head accelerations seen in the hands-on-knees positon in the B-D comparison do not mitigate these findings. This is true because head accelerations well in excess of those reported in this study have been tolerated in other human impact tests without difficulty (Brinkley et al., 1977; Carter, 1959; Lombard, 1951).

The potential operational significance of the experimentally determined trends in seat loads is noteworthy. As previously indicated, the seat loads indirectly provide a measure of vertebral column loading. Since excessive axial loading is a well known cause of vertebral fracture during ejection, it is reasonable to assume that a reduction in this loading could have a beneficial effect operationally, in terms of decreasing the rate of vetebral fracture. The modest reduction in seat loads observed by using the hands-on-knees position experimentally could be beneficial if used operationlly in, for example, the F/FB-111 crew module prior to landing impact.

Utilizing the upper extremities to carry loads as a means of unloading the vertebral column is not a new impact protection concept. In his review of the early impact test literature, Cofer et al. (1946) reported that the Germans had conducted catapult tests with and without the arms positioned on armrests adjusted to the appropriate height. In a test without armrest support, a vertebral fracture was reported at a maximum catapult acceleration of 28 G (velocity change not specified). It was concluded that higher impact acceleration levels could be tolerated with armrest bracing than without. This work was corroborated by subsequent human impact tests in which forces exerted by the upper extremities on armrests were quantified (Savely and Ames, 1946).

Since use of the hands-on-knees position has been demonstrated to decrease vertebral loading, as evidenced by reduced seat loads, by carrying a greater proportion of the load through the extremities to the footrest, it is recommended that consideration be given to employing this hands-on-knees technique operationally. This could be done in situations in which crewmembers were able to anticipate impending vertical impacts.

C. RESTRAINT CONFIGURATION EFFECTS

In this study, human response to vertical impact in a proposed, modified F/FB-111 restraint harness was compared to such response in a conventional double shoulder strap - lap belt configuration. Use of the conventional harness was accompanied by increases in vertical and resultant head acceleration and head Severity Index, increases in the chest Severity Index, increases in lap belt loads and seat loads, and decreases in shoulder strap loads. These findings were true regardless of headrest adjustment. With the headrest forward of the plane of the seat back (comparison C-E), footrest loads were also increased in the conventional harness. With the headrest in the aft position, chest acceleration in the +X axis was increased in the conventional harness. These findings are summarized in Table 12.

These results indicate that the F/FB-111 harness reacts a greater proportion of the inertial load through the harness than the conventional harness. The statistically significant increases in vertical and resultant seat loads in the conventional harness are noteworthy. These statistically significant findings are probably due to the unique geometry of the F/FB-111 harness, which incorporates reflection straps, a shoulder harness yoke, and a crotch strap. Further vertical human impact studies should be accomplished in the conventional harness with an added crotch strap in order to help clarify these experimental findings.

SECTION 6

SUMMARY

A. PROGRAM OBJECTIVES

This test program was designed to achieve the following objectives (Section 1B).

1. Evaluate human response to vertical impact with the headrest 1 inch aft of the plane of the seat back compared to the headrest adjustment 2 1/4 inches forward of the seat back plane.

2. Evaluate human response to vertical impact in the hands-on-knees bracing position compared to the hands-in-lap position in which upper extremity bracing is precluded.

3. Evaluate human response to vertical impact in a proposed, modified F/FB-111 restraint harness compared to response in a conventional double shoulder strap - lap belt restraint configuration.

4. Obtain human impact data for use in the development of current and future mathematical models intended to predict human response to impact.

B. TEST PROGRAM

1. A factorial experimental design was used in order to achieve the above program objectives. All tests were conducted with the vertical centerline of the seat back parallel to the impact axis (Section 2A).

2. The Vertical Deceleration Tower (VDT) was utilized to provide experimental level $+G_z$ impacts of 10 G (26 ft/sec). (Section 3A).

3. The seat utilized in this program was a crew seat salvaged from a F/FB-111 crew module. The proposed, modified F/FB-111 restraint harness utilized was provided by General Dynamics. Instrumentation was provided by AFAMRL (Sections 3B and 3C).

4. Human volunteer subjects were medically qualified and utilized in accordance with applicable human use regulations (Section 3D).

5. Relevant accelerations, velocities, and forces were measured electronically. Appropriate physiological data were obtained. Subject motion was documented by high-speed cameras (Sections 3C, 3D, and 3E).

6. One-hundred and fifteen human impact tests were conducted from July to October 1980. Thirty-three of those experiments were at the 8 G orientation level and eighty-two of the tests were conducted at the 10 G experimental level (Sections 3D and 3E).

7. The Wilcoxon paired-replicate rank test was utilized in data analysis to establish the statistical significance of test results (Section 2B).

C. TEST RESULTS

1. All accelerations, velocities, and forces measured in these test conditions were considered to be well within human tolerance (Section 4E .

2. At least four of the sixteen subjects who participated in this test program experienced physical difficulty reaching the aft headrest location. These subjects were required to slightly extend the cervical spine in order to place helmet on headrest prior to the experiment (Section 4B).

3. In the fore-aft headrest adjustment comparison, maximum horizontal head displacement was increased with the headrest 2 1/4 inches forward of the plane of the seat back. Maximum vertical head dis-placement measured at the cheek was also increased. A statistically significant increase in head acceleration in the -X axis was seen with the headrest forward. With the headrest aft, a statistically significant increase in head acceleration in the +X axis was observed in tests conducted in the F/FB-111 harness. These findings were consistent with increased forward and downward head rotation with the headrest forward and increased forward-translation of the head with the headrest aft (Sections 4B, 5A).

4. In the upper extremity bracing comparison, statistically significant decreases in -X chest acceleration and resultant seat loads as well as statistically significant increases in footrest loads were observed in the hands-on-knees position compared to the hands-in-lap position. With the headrest aft, small but statistically significant increases in vertical and resultant head acceleration were also observed in the hands-on-knees position. These findings are consistent with the interpretation that the hands-on-knees position unloads the vertebral column and carries a great proportion of the load through the extremities to the footrest (Sections 4C, 5B).

5. In the restraint harness comparison, statistically significant increases in resultant head acceleration, head Severity Index, lap belt and seat loads and statistically significant decreases in shoulder strap loads were observed in the conventional harness compared to the F/FB-111 harness. These findings indicated that the F/FB-111 harness reacts a greater proportion of the impact response through the harness itself compared to the conventional double shoulder strap - lap belt configuration (Sections 4D, 5C).

6. Subtolerance human impact tests can be an effective tool in the investigation of impact protection systems and voluntary bracing techniques.

D. RECOMMENDATIONS

1. Additional impact tests with human volunteer subjects exploring fore-aft headrest adjustments between the extremes investigated in this study may be useful (Section 5A).

2. Consideration should be given to utilizing the hands-on-knees bracing position operationally prior to anticipated vertical impacts in order to help unload the vertebral column. For example, the technique may be useful as a post-ejection bracing procedure in the F/FB-111 prior to landing impact of the crew module. Before such a recommendation may be confidently made, however, a direct comparison of human impact response in the hands-on-knees position to response in the currently recommended crossed-arms position will be required (Section 5B).

3. The findings of the restraint harness configuration comparison may be clarifed by additional vertical human impact tests of the conventional harness with an added crotch strap (Section 5C).

APPENDIX A

DATA ACQUISITION EQUIPMENT AND METHODS

Prepared by

Harold F. Boedeker
Wesley M. Waldron

Dynalectron Corporation
Scientific Services Division

INTRODUCTION

Under Contract F33615-79-C-0523, Dynalectron was requested by the Air Force Aerospace Medical Research Laboratory/Biomechanical Protection Branch to instrument a test fixture fabricated by General Dynamics Corporation and collect data under test conditions for the F/FB-111 Crew Seat and Restraint System Head Rest Position evaluation program. The testing was conducted in one axis of acceleration on the Vertical Deceleration Tower Test Facility located at the Air Force Aerospace Medical Research Laboratory, Building 824, Area B, Wright-Patterson Air Force Base. The following is a discussion of the equipment and techniques used in acquiring and processing data that describes the kinematic and inertial responses of the human body. Installation and sensor specifications are also included in the discussion.

DATA MEASUREMENT DEVICES

This evaluation program was instrumented using thirty-seven transducers. The Digital Instrumentation Requirements sheets of Figures A-1 through A-3 contain the pertinent data for each channel.

SUBJECT INSTRUMENTATION

Each subject was instrumented with six accelerometers. These accelerometers were configured in groups of three to create two triaxial measuring packages. Each package was mounted to indicate accelerations in the X, Y and Z axes. Figure A-4 shows the coordinate system utilized and the corresponding output polarity for an applied acceleration.

The accelerometer package used to measure head accelerations was designed to be inserted into the subject's mouth. It consisted of three Endevco accelerometers, Model 2264-200, mounted to a plastic block with dimensions of 7/16 x 7/16 x 7/16 inches. This assembly was covered with a medical grade silicone rubber sealant to provide electrical isolation. The three accelerometer cables were routed to one end of the block. Next, a dental bracket that had been custom fitted to the subject's mouth was mounted to the block. The approximate weight of the completed package was 50 grams. When the dummy subject was used the dental bracket was removed and the package was mounted to a bracket at the approximate center of the dummy's head. Specifications for the accelerometers used in this package are shown in Figure A-5.

The accelerometer package used to measure chest accelerations was designed to be attached externally to the subject's chest. It consisted of three Endevco accelerometers, Model 2264-150, mounted to an aluminum block that measured approximately 5/8 x 5/8 x 3/4 inches. This

assembly was inserted into an aluminum protection shield that was attached to a length of Velcro fastener strap. In use, the completed package was placed over the subject's sternum while the Velcro strap was wrapped around the subject and fastened. Specifications for the accelerometers used in this package are shown in Figure A-6.

HARNESS INSTRUMENTATION

During this evaluation program, a proposed, modified F-111 harness was used as well as a conventional harness. Figure A-7 shows the test fixture, seat and F-111 harness. Figure A-8 shows the test fixture, seat and conventional harness. The output polarity of each load cell corresponds to an applied load in accordance with the coordinate system shown in Figure A-9.

A total of seven load cells were used to instrument the F-111 harness. Two of the transducers used were Lebow automotive belt load cells, Model 3419. These load cells monitored the load applied to the left and right inertia reel straps as shown in Figure A-10. Specifications for these load cells are shown in Figure A-11.

The five remaining load cells utilized the restraint harness hardware. Four 350 ohm resistive strain gages were bonded to each piece of harness hardware and wired in a bridge configuration. Figure A-12 shows the strain gage placement and wiring diagram. Figure A-10 shows the two reflection straps and Figure A-13 shows the lap and crotch strap units.

The conventional harness was instrumented using four load cells as shown in Figure A-14. Two of the transducers used were Lebow automotive belt load cells and two were harness hardware load cells.

SEAT PAN INSTRUMENTATION

The seat pan instrumentation measured both acceleration and load. The acceleration measurements were performed using three Endevco accelerometers, Model 2264-200. The accelerometers were mounted to a plastic block, 3/4 x 1 x 1 inch, to form a triaxial package. This package

was secured to the seat pan assembly to indicate accelerations in the X, Y and Z axes as shown in Figure A-15. Figure A-4 shows the coordinate system utilized and the corresponding output polarity for an applied acceleration. Figure A-5 shows the specifications for the accelerometers used in this package.

The load measurements were made utilizing two types of load cells to fit the physical size limitations of the seat pan. Z-axis load measurements were taken using three Strainsert Flat Load Cells, Model FL2.5U-2SKPT. These cells were used in a three point mounting configuration as shown in Figure A-15. Specifications for these load cells are shown in Figure A-16. The X-axis and Y-axis loads were measured using load links specifically designed for this application by General Dynamics. These load links were instrumented with resistive strain gages as shown in Figure A-17. Each load link had four resistive arms with 2 arms active. Each end of the load links housed a swivel ball to eliminate cross-axis load effects on the measurements. The output polarity of each load cell corresponds to an applied load in accordance with the coordinate system shown in Figure A-9.

FOOT REST INSTRUMENTATION

The foot rest assembly, as shown in Figure A-18, was instrumented using three GSE load cells, Model T-10952C. These triaxial load cells were capable of measuring 2500 lb in the Z-axis and 500 lb in both the X and Y-axes. Figure A-19 illustrates the location and orientation of these load cells. The output polarity of each load cell corresponds to an applied load in accordance with the coordinate system shown in Figure A-9.

CARRIAGE INSTRUMENTATION

For acceleration measurements the carriage was instrumented with a triaxial accelerometer package. This package consisted of three accelerometers mounted to a 3/4 x 1 x 1 inch block. The accelerometers used were all Endevco transducers with the following Model numbers and axis measurements; 2262A-200 for Z-axis, 2264-200 for X-axis and 2264-150 for Y-axis.

Specifications for these accelerometers are shown in Figures A-20, A-5 and A-6 respectively. This package was securely mounted to the underside of the carriage. Figure A-4 shows the coordinate system utilized and the corresponding output polarity for an applied acceleration.

Carriage velocity measurements were obtained by means of a velocity wheel running against the rail. This unit consisted of a Globe Industries tachometer, Model 22A672, and a wheel mounted on its shaft. The wheel was aluminum with a rubber "O"-ring around the circumference. To insure continous rail contact the wheel assembly was spring loaded against the rail. The wheel was calibrated to output voltage as a function of velocity.

CALIBRATION

Strainsert Load Cells were calibrated on a periodic basis at the Precision Measurement Equipment Laboratories (PMEL), Wright-Patterson Air Force Base. The PMEL returns each device with a certificate providing current sensitivity and linearity data. Factory calibration data for the GSE Triaxial Load Cells were used for this evaluation program.

All accelerometers, load links, Lebow belt load cells and harness hardware load cells were calibrated at the AFAMRL/BBP Laboratory, Wright-Patterson Air Force Base. These calibrations were performed prior to (pre) and upon completion of (post) the evaluation program. This calibration data is shown in Figures A-21 and A-22.

Accelerometers were calibrated by using the reciprocity method to determine accelerometer frequency and phase characteristics as well as sensitivity. This method utilized a shaker table to which a "standard" accelerometer and the accelerometer to be calibrated were mounted. This "standard" accelerometer is calibrated yearly to standards traceable to the National Bureau of Standards. The sensitivity was determined by comparing the outputs of the standard and test accelerometer at 100Hz and 40G. The frequency and phase response was determined by driving the shaker table with a random noise generator and analyzing the output data by

Fourier Analysis via the PDP 11/15 and Time Data unit. The natural frequency and the dampening factor of the test accelerometer were both determined from this information.

The load cells mentioned previously in this section were all calibrated on a special test fixture. The sensitivity and linearity of each load cell was obtained by comparing its output with the output of a "standard" load cell output placed under an identical tension load. This "standard" load cell is calibrated on a yearly basis by standards traceable to the National Bureau of Standards.

SEAT GEOMETRY

The seat geometry drawings in Figure A-23 and A-24 show the polarity of the various output signals. Included in the drawings are the location dimensions for each fixed load cell and the variables introduced by the seat height and seat pan adjustment.

DIGITAL INSTRUMENTATION REQUIREMENTS

PROGRAM Head Rest Position Study DATE 1 July 80 THRU 23 Sept 80

FACILITY Vertical Deceleration Tower RUN 308 THRU 449

DYNALECTRON CORPORATION

DATA CHANNEL	DATA POINT	XDUCER MFG & TYPE	S/N	XDUCER SENS	EXCITE V / CHAN	FILTER SERIES / S/N	AMP GAIN / S/N	SAMPLE RATE / FORMAT	F.S. SENS	FILTER HZ	XDUCER ZERO / RANGE	BRIDGE BALANCE RESISTORS	BRIDGE COMPLETION RESISTORS	SPECIAL NOTATIONS
1	Carriage Z	Endevco 2262A-200	FR42	4.138 mV/g	10.00 / 1	60 / 1	25 / 37	1K / 1	24.17g	120	2.50 / +5.0 -0.0	-	-	
2	Head X	Endevco 2264-200	BP1U	2.462 mV/g	10.00 / 2	60 / 2	50 / 20	1K / 1	20.31g	120	" / "	680K -into gnd	1.65K	
3	Head Y	"	BQ42	2.709 mV/g	10.00 / 3	60 / 3	100 / 17	1K / 1	9.23g	120	" / "	114K +into gnd	"	
4	Head Z	"	BQ51	2.550 mV/g	10.00 / 4	60 / 4	25 / 10	1K / 1	39.22g	120	" / "	250K -into gnd	"	
5	Chest X	Endevco 2264-150	BC26	2.782 mV/g	10.00 / 5	60 / 5	50 / 26	1K / 1	17.97g	120	" / "	1.2M -into gnd	"	
6	Chest Y	Endevco 2264-150	BB13	2.416 mV/g	10.00 / 6	60 / 6	100 / 5	1K / 1	10.35g	120	" / "	305K +into gnd	"	
7	Chest Z	"	2A20	2.577 mV/g	10.00 / 7	60 / 7	25 / 7	1K / 1	38.80g	120	" / "	155K -into gnd	"	
8	Left Lap	MicroMeas EA06-125 BZ-350	*13	14.93 uV/lb	10.00 / 8	60 / 8	201 / 11	1K / 1	833 lb	120	" / "	39.5K -into gnd	-	Used all tests through 406. Check additional notes for subsequent use.
9	Right Lap	"	*14	13.71 uV/lb	10.00 / 9	60 / 9	201 / 9	1K / 1	907 lb	120	" / "	40K -into gnd	-	Used all tests through 406. Check additional notes for subsequent use.
10	*N-G Strap	"	143377	1.933 uV/lb	10.00 / 10	60 / 10	800 / 10	1K / 1	1617 lb	120	" / "	470 K -into gnd	-	Test 308 only Gain at 402
11	Left Seat Pan	Strainser FL2.5U-2SPKT	3294-3	8.040 uV/lb	10.00 / 11	60 / 11	201 / 7	1K / 1	1547 lb	120	" / "	-	-	
12	Right Seat Pan	"	3294-4	7.988 uV/lb (tension)	10.00 / 12	60 / 12	201 / 10	1K / 1	1557 lb	120	" / "	-	-	
13	Center Seat Pan	"	3294-6	8.011 uV/lb	10.00 / 13	60 / 13	201 / 3	1K / 1	1553 lb	120	" / "	-	-	
14	*Left Reflect Strap	MicroMeas EA-06-125 BZ-350	02-10	26.11 uV/lb	10.00 / 14	60 / 14	100 / 15	1K / 1	957 lb	120	" / "	-	-	

Computer start B -3; off D +1

See* Page 3 of 3 for additional notes on conventional harness use.

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Figure A-1 - Digital Instrumentation Requirements

DIGITAL INSTRUMENTATION REQUIREMENTS

PROGRAM Head Rest Position Study DATE 1 July 80 THRU 23 Sept 80

FACILITY Vertical Deceleration Tower RUN 308 THRU 449

DYNALECTRON CORPORATION

DATA CHANNEL	DATA POINT	REDUCER MFG & TYPE	S/N	REDUCER SENS	EXCITE V / CHAN	FILTER SERIES / S/N	AMP GAIN / S/N	SAMPLE RATE / FORMAT	P.B. SENS	FILTER HZ	REDUCER ZERO / RANGE	BRIDGE BALANCE RESISTORS	BRIDGE COMPLETION RESISTORS	SPECIAL NOTATIONS
15	*Right Reflection Strap	Micro-Meas EA-06-125 BZ-350	01-3	34.29 uV/lb	10.00 / 15	60 / 15	100 / 21	1K / 1	729 lb	120	2.50 / +5.0 -0.0	20K -into gnd	-	
16	Left Inertia Reel Strap	Lebow 3419-3.5K	363	*8.03 uV/lb	10.00 / 16	60 / 16	402 / 8	1K / 1	774 lb	120	" / "	-	-	Test 308 only Sens. @ 8.01 uV/lb
17	Right Inertia Reel Strap	"	364	*7.16 uV/lb	10.00 / 17	60 / 17	402 / 4	1K / 1	869 lb	120	" / "	-	-	Test 308 only Sens. @ 7.40 uV/lb
18	Left Load Link X	Micro-Meas EA-06-062- BJ-350	001	10.80 uV/lb	10.00 / 18	60 / 18	402 / 11	1K / 1	576 lb	120	" / "	106K +into gnd	-	
19	Right Load Link X	"	002	10.05 uV/lb	10.00 / 19	60 / 19	402 / 13	1K / 1	619 lb	120	" / "	55K -into gnd	-	
20	Left Foot Load X	SSE -10952C	001	27.64 uV/lb	10.00 / 20	60 / 20	100 / 22	1K / 1	904 lb	120	" / "	-	-	
21	Left Foot Load Y	"	001	28.61 uV/lb	10.00 / 21	60 / 21	100 / 24	1K / 1	874 lb	120	" / "	-	-	
22	Left Foot Load Z	"	001	16.93 uV/lb	10.00 / 22	60 / 22	50 / 14	1K / 1	2953 lb	120	" / "	-	-	
23	Right Foot Load X	"	002	28.36 uV/lb	10.00 / 23	60 / 23	100 / 6	1K / 1	882 lb	120	" / "	-	-	
24	Right Foot Load Y	"	002	28.16 uV/lb	10.00 / 24	60 / 24	100 / 19	1K / 1	888 lb	120	" / "	-	-	
25	Right Foot Load Z	"	002	16.61 uV/lb	10.00 / 25	60 / 25	50 / 19	1K / 1	3010 lb	120	" / "	-	-	
26	Ten Foot Load X	"	003	27.94 uV/lb	10.00 / 26	60 / 26	100 / 25	1K / 1	895 lb	120	" / "	-	-	
27	Ten Foot Load Y	"	003	28.08 uV/lb	10.00 / 27	60 / 27	100 / 16	1K / 1	890 lb	120	" / "	-	-	
28	Ten Foot Load Z	"	003	16.50 uV/lb	10.00 / 28	60 / 28	50 / 16	1K / 1	3030 lb	120	" / "	-	-	

* Reference page 3 of 3

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Figure A-2 - DIGITAL INSTRUMENTATION REQUIREMENTS

DIGITAL INSTRUMENTATION REQUIREMENTS

PROGRAM Head Rest Position Study DATE 1 July 80 THRU 23 Sept 80

FACILITY Vertical Deceleration Tower RUN 308 THRU 449

DYNALECTRON CORPORATION

DATA CHANNEL	DATA POINT	XDUCER MFG & TYPE	S/N	XDUCER SENS	EXCITE V / CHAN	FILTER SERIES / B/W	AMP GAIN / B/W	SAMPLE RATE / FORMAT	F.S. RANGE	FILTER HZ	XDUCER ZERO / RANGE	BRIDGE BALANCE RESISTORS	BRIDGE COMPLETION RESISTORS	SPECIAL NOTATIONS
29	Velocity	Globe 22A672	3	.5019 Volts/FPS	- / 29	60 / 29	1 / -	1 / 1K	62.2FPS	120	5.00 / +5.0 -0.0	-	-	Signal Attenuated by 6.242 prior to sig. conditioner amplifier Neg output sens.=.5019/6.242=.0804 volts/fps.
31	Carriage Y	Endevco 2264-150	CB11	2.346 mV/g	10.00 / 31	60 / 31	50 / 3	1 / 1K	21.31g	120	2.50 / +5.0 -0.0	1M -into gnd	1.65K	*Test 308-424 SN BV56, 2.767 mV/g
32	Seat X	Endevco 2264-200	BV63	2.569 mV/g	10.00 / 32	60 / 32	50 / 27	1 / 1K	19.46g	120	" / "	397K -into gnd	1.47K	*Test 308-340 SN. BV95,Sens.@ 2.990 mV/g
33	Seat Y	"	BV41	3.280 mV/g	10.00 / 33	60 / 33	50 / 5	1 / 1K	15.24g	120	" / "	125K -into gnd	1.47K	
34	Seat Z	"	BM63	2.814 mV/g	10.00 / 34	60 / 34	50 / 32	1 / 1K	17.77g	120	" / "	512K -into gnd	1.63K	
35	Center Load Link Y	MicroMeas A-06-062-J-350	004	10.27 uV/lb	10.00 / 35	60 / 35	402 / 5	1 / 1K	606 lb	120	" / "	82K +into gnd	-	
36	Carriage X	Endevco 2264-200	BX49	2.561 mV/g	10.00 / 36	60 / 36	50 / 28	1 / 1K	19.52g	120	" / "	127K -into gnd	1.47K	
47	2.5 Volt Bias		-	-	- / 47	180	1 / 27	1 / 1K	2.5 Volt	360	" / "	-	-	
48	10 Volt Exc.		-	-	- / 48	180	1 / 14	1 / 1K	5 Volt	360	0.0 / "	-	-	10 Volt divided by 2 atten.
8	Left Lap	MicroMeas A-06-125 BZ-350	*15 Specia	14.10 uV/lb	10.00	60 / 8	201 / 11	1 / 1K	882 lb	120	2.50 / "	47K -into gnd	-	Check additional notes for tests used
9	Right Lap	"	*16 Specia	15.28 uV/lb	10.00	60 / 9	201 / 9	1 / 1K	814 lb	120	2.50 / "	19K -into gnd	-	Check additional notes for tests used

* Conventional Harness Use:
Left Lap SN.15, Chan 8 and Right Lap SN.16, Chan 9 used in following Tests; H-G Strap, left and right reflection straps not used in following Tests: 407-416; 429-439; 441-449.

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Figure A-3 - DIGITAL INSTRUMENTATION REQUIREMENTS

ACCELEROMETER COORDINATE SYSTEM

ACCELERATION

Accelerometers will be oriented and wired to provide an output corresponding to the applied acceleration. Use this table as a reference:

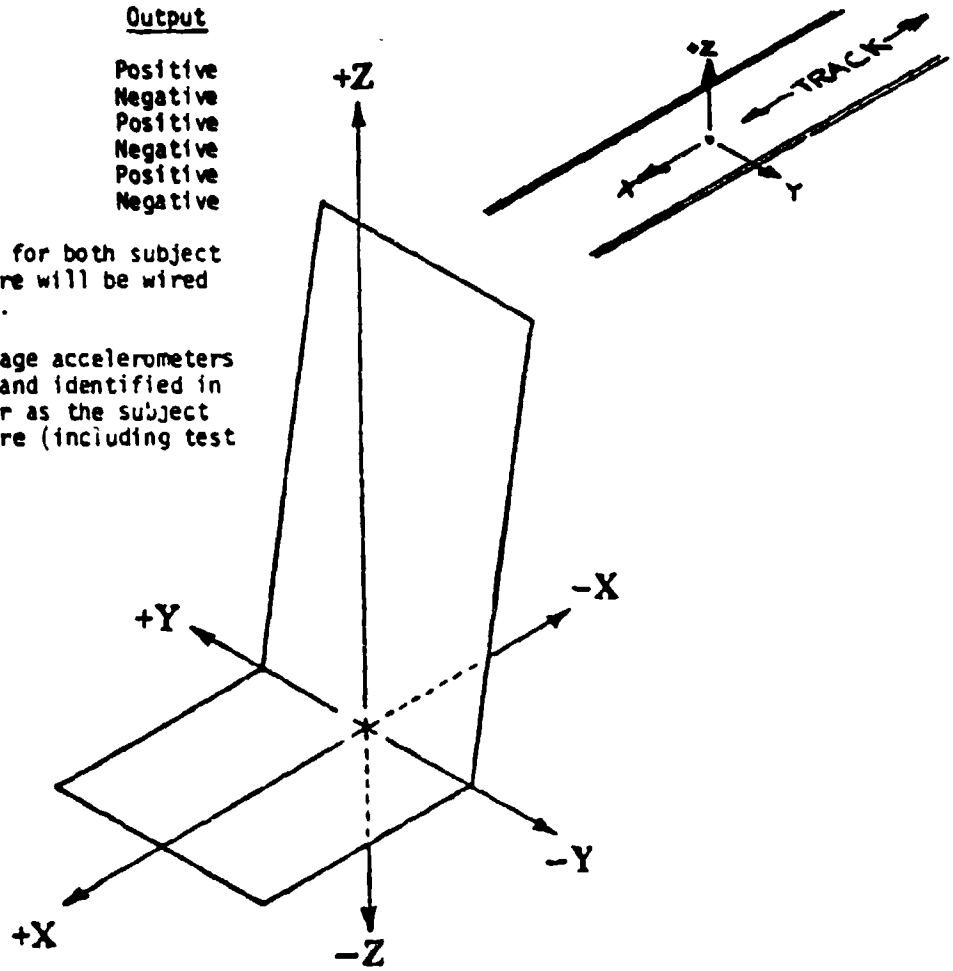
Acceleration	Output
+Gx	Positive
-Gx	Negative
+Gy	Positive
-Gy	Negative
+Gz	Positive
-Gz	Negative

Accelerometers for both subject and test fixture will be wired in this manner.

Sled and carriage accelerometers will be wired and identified in the same manner as the subject and test fixture (including test profiles).

BARE SLED AND MACHINE TESTS

Accelerometers will be oriented to provide outputs to agree with track coordinate system with polarities as noted in test log.



AMRL BBP COORDINATE SYSTEM

(Left Hand Rule)

Figure A-4

MODEL 2264-200

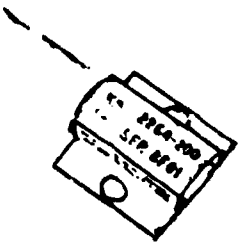
±200 g
One gram

MINIATURE PIEZORESISTIVE ACCELEROMETER

The Model 2264-200 is a very low mass, piezoresistive accelerometer designed for modal studies, flutter testing and similar applications requiring good low frequency response and minimum mass loading.

With only a small amount of damping, the Model 2264-200 has no phase shift over its useful frequency range of steady state to 1200 Hz. Protection against overranging results from the high environmental rating of ±1000 g peak. The accelerometer can be operated over a temperature range of 0°F to 150°F (−18°C to 66°C).

The 2264-200 utilizes Piezite® Element Type P-11 gages in a half bridge circuit providing a low impedance nominal output of 500 mV full scale at 10 Volts dc excitation.



SPECIFICATIONS FOR MODEL 2264-200 ACCELEROMETER

DYNAMIC	
RANGE	−200 g to +200 g
SENSITIVITY (at rated excitation)[1]	2.5 mV/g, nominal; 2.0 mV/g, minimum
MOUNTED RESONANCE FREQUENCY	6700 Hz, nominal
AMPLIFICATION FACTOR, Q	10, maximum, at resonance and 75°F
FREQUENCY RESPONSE[2] (reference 100 Hz)	±10% max., 0 to 1200 Hz at +75°F (24°C)
TRANSVERSE SENSITIVITY	3% maximum
LINEARITY AND HYSTERESIS[3]	±2% of reading, maximum, 0 to 150 g; ±2.5% of reading, maximum, 0 to 200 g.
THERMAL SENSITIVITY SHIFT	±40 mV max., at 0°F and 150°F (−18°C and 66°C), ref. 75°F (24°C)
WARMUP TIME	1 minute
ELECTRICAL	
EXCITATION[3]	10.0 V dc
RESISTANCE PER ARM[4]	1700Ω ± 20%, at + 75°F (24°C)
ZERO MEASURAND OUTPUT	± 50 mV dc max., at + 75°F
THERMAL ZERO SHIFT	±40 mV max., at 0°F and 150°F (−18°C and 66°C)
INSULATION RESISTANCE[5]	10M Ω minimum at 100 V dc

NOTES

[1] Measured with steady state acceleration.

[2] On shock measurements, minimum pulse duration for half sine or triangular pulses should exceed 1.5 milliseconds to avoid excessive high frequency ringing. (See Endevco Piezoresistive Accelerometer Manual.)

[3] Unit is calibrated at 10.0 V dc. Lower excitation voltages may be used but should be specified at time of order. Use ENDEVCO® Model 4233 Power Supply, or Model 4470 Signal Conditioning as excitation source.

[4] Due to self heating of the piezoresistive elements the measured resistance is sensitive to the applied voltage.

[5] Measured between all leads tied together and shield or case.

ENVIRONMENTAL		
ACCELERATION LIMIT[1] (in any direction)	Static:	± 1000 g.
	Sinusoidal:	± 1000 g pk.
	Shock:	± 1000 g pk, 1.5 millisecond duration or longer. CAUTION: Keep protective sleeve on accelerometer until ready to use.
TEMPERATURE	Operating:	0°F to 150°F (−18°C to 66°C)
	Non-Operating:	−65°F to 200°F (−54°C to 93°C)
HUMIDITY		Epoxy Sealed
ALTITUDE		Not Affected

Figure A-5 - Accelerometer Specifications

MODEL 2264-150

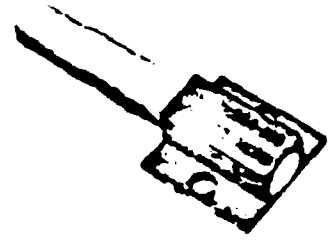
±150 g
One gram

MINIATURE PIEZORESISTIVE ACCELEROMETER

The Model 2264-150 is a very low mass, piezoresistive accelerometer designed for modal studies, flutter testing and similar applications requiring good low frequency response and minimum mass loading.

With only a small amount of damping, the Model 2264-150 has no phase shift over its useful frequency range of steady state to 1200 Hz. Protection against overranging results from the high environmental rating of ± 1000 g peak. The accelerometer can be operated over a temperature range of 0°F to +150°F.

The 2264-150 utilizes Piezite® Element Type P-11 gages in a half bridge circuit providing a low impedance nominal output of 375 mV full scale at 10 Volts dc excitation.



TWO TIMES ACTUAL SIZE

SPECIFICATIONS FOR MODEL 2264-150 ACCELEROMETER
(According to ANSI and ISA Standards)

DYNAMIC	
RANGE	−200 g to +200 g
SENSITIVITY (at rated excitation)[1]	2.5 mV/g, nominal; 2.0 mV/g, minimum
MOUNTED RESONANCE FREQUENCY	4700 Hz, nominal
AMPLIFICATION FACTOR, Q	10, maximum, at resonance and 75°F
FREQUENCY RESPONSE[2] (reference 100 Hz)	±10% max., 0 to 1200 Hz at +75°F (24°C)
TRANSVERSE SENSITIVITY	3% maximum
LINEARITY[3]	±2% of reading, maximum, 0 to 150 g; ±2.5% of reading, maximum, 0 to 200 g.
THERMAL SENSITIVITY SHIFT	±10% max., at 0°F and +150°F, ref. +75°F
WARM-UP TIME	1 minute
ELECTRICAL	
EXCITATION[4]	10.0 V dc
RESISTANCE PER ARM[5]	1700Ω ± 20%, at +75°F (24°C)
ZERO MEASURAND OUTPUT	± 50 mV dc max., at +75°F
THERMAL ZERO SHIFT	± 50 mV max., over rated temperature range
INSULATION RESISTANCE[6]	10M Ω minimum at 100 V dc

NOTES

[1] Measured with steady state acceleration.

[2] For shock measurements, minimum pulse duration for half sine or triangular pulses should exceed 1.0 millisecond to avoid excessive high frequency ringing. (See Endevco Piezoresistive Accelerometer Manual.)

[3] Unit is calibrated at 10.0 V dc. Lower excitation voltages may be used but should be specified at time of order. Use ENDEVCO® Model 4200 Power Supply, 6838 Bridge Sec., or Model 4470 Signal Conditioning as excitation source.

[4] Due to self heating of the piezoresistive elements, the measured resistance is sensitive to the applied voltage.

[5] Measured between all leads tied together and shield or case.

ENVIRONMENTAL		
ACCELERATION LIMIT[7]		± 1000 g pk shock pulse, one millisecond duration or longer. CAUTION: Keep protective sleeve on accelerometer until ready to use.
TEMPERATURE	Operating:	0°F to 150°F (−18°C to 66°C)
	Non-Operating:	−65°F to 200°F (−54°C to 93°C)
HUMIDITY		Epoxy Sealed

Figure A-6 - Accelerometer Specifications

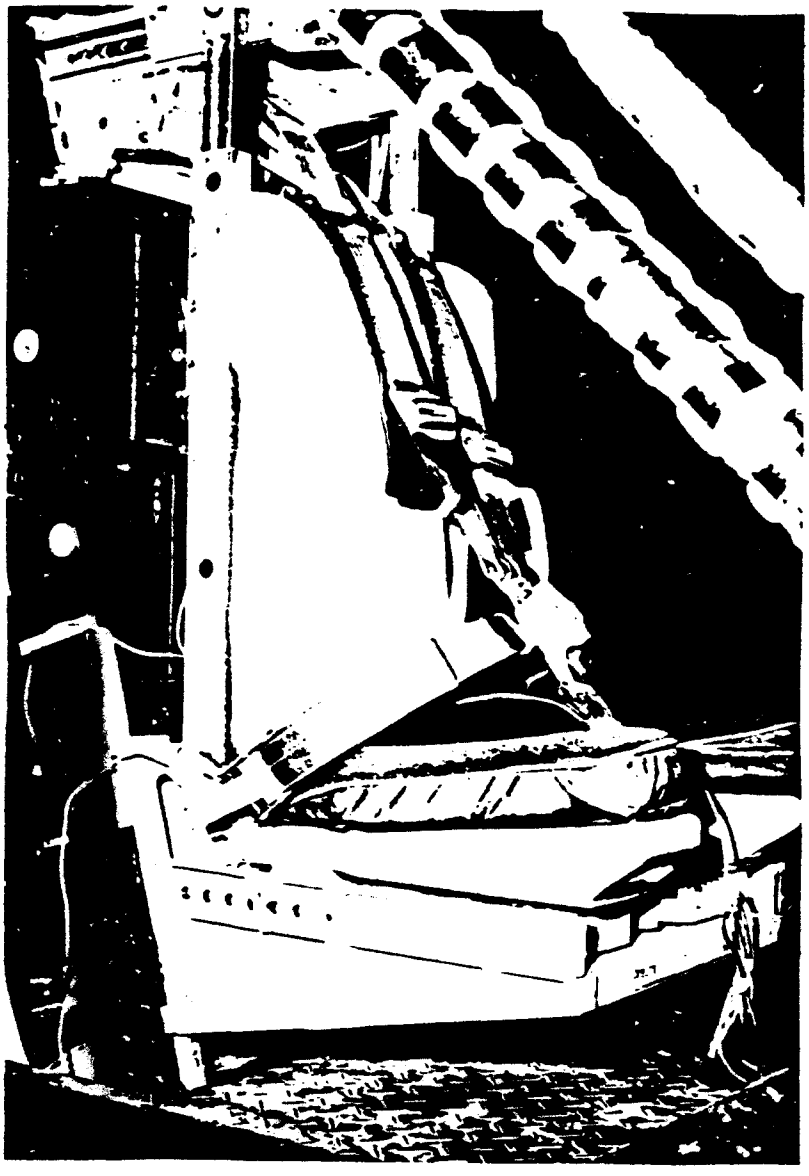


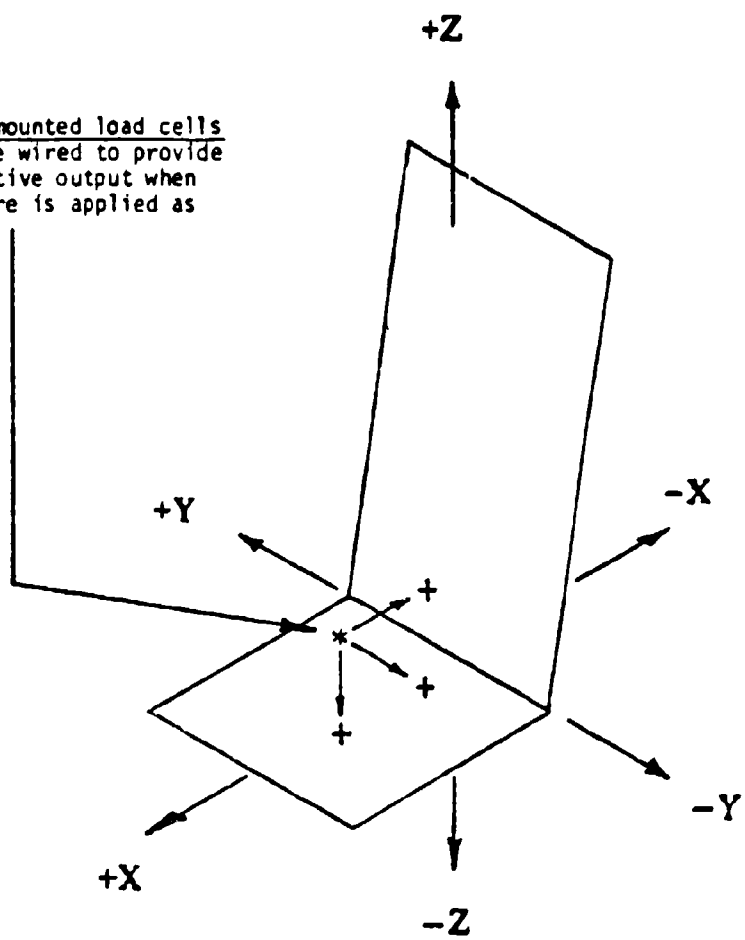
Figure A-7 - HARNESS ASSEMBLY (PROPOSED, MODIFIED F-111)

Figure A-8 - HARNESS ASSEMBLY (Conventional)

LOAD CELL COORDINATE SYSTEM

Swivel mount and Lebow belt load cells will be wired to provide a positive output when the belt is pulled.

Fixed mounted load cells will be wired to provide a positive output when pressure is applied as shown.



AMRL BBP COORDINATE SYSTEM

(Left Hand Rule)

Figure A-9

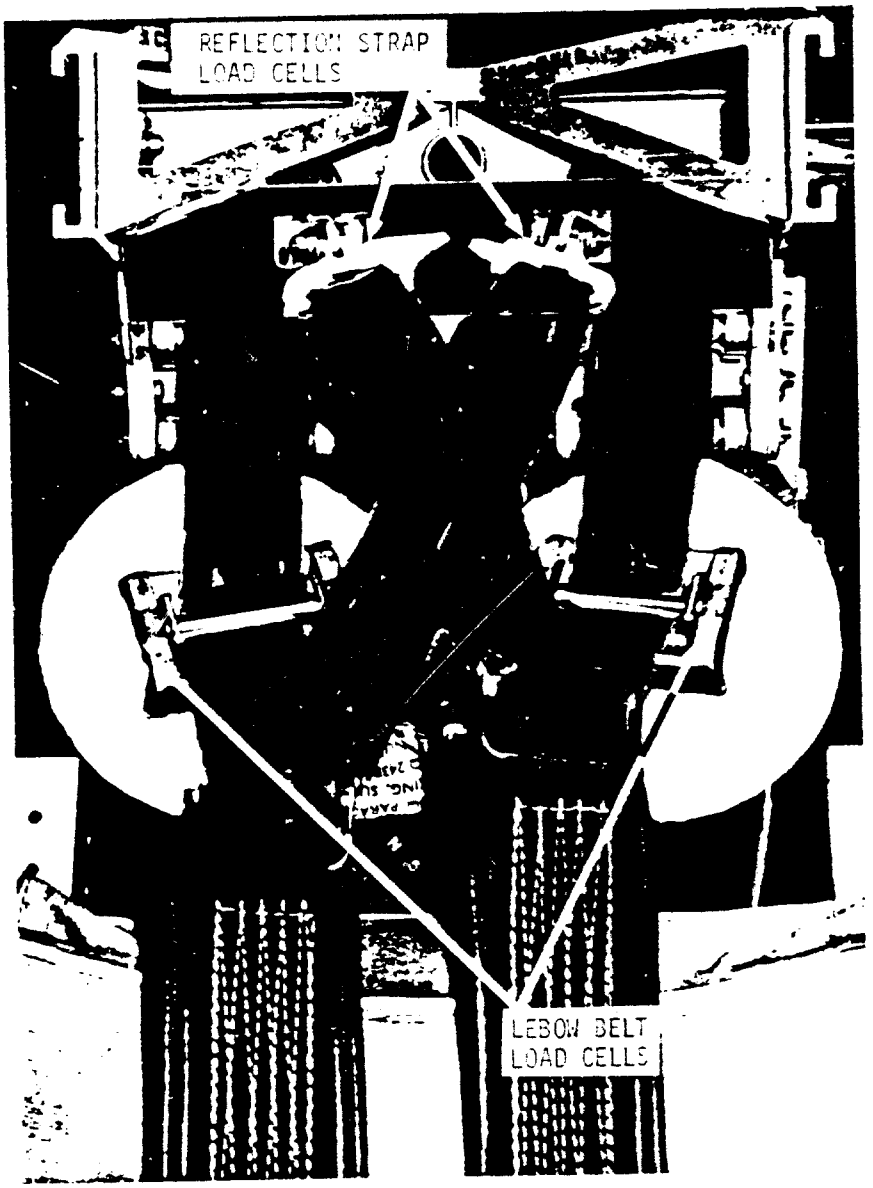
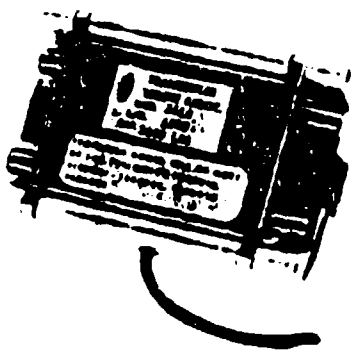


Figure A-10 - HARNESS INSTRUMENTATION

AUTOMOTIVE LOAD CELLS

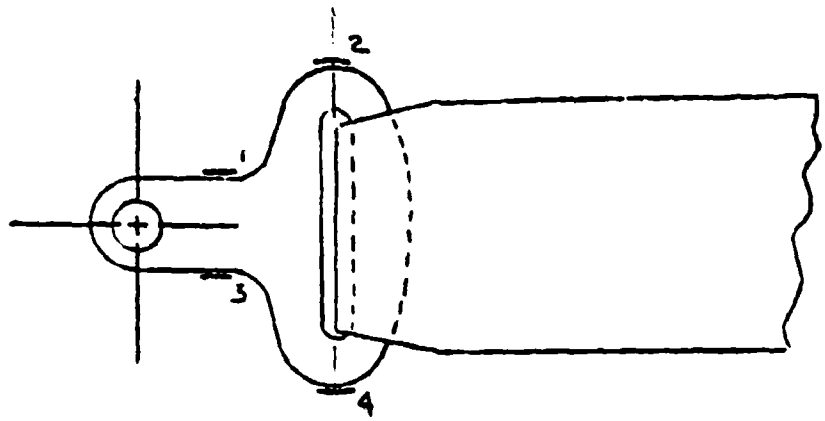


Model 3419
Capacity Available
3500 lbs.

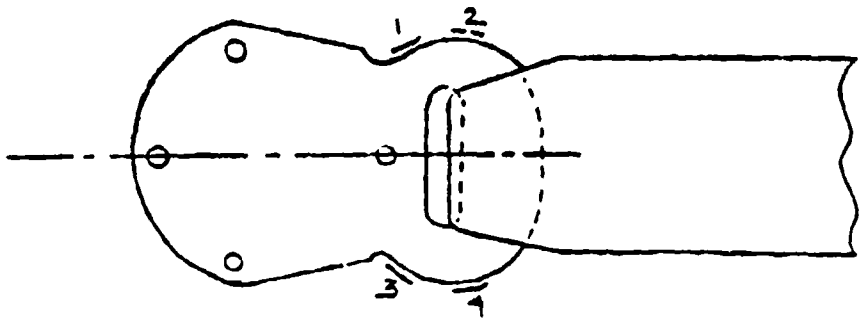
SPECIFICATIONS

Output at rated capacity: millivolts per volt, nominal	± 2
Nonlinearity: of rated output	± 2%
Hysterisis: of rated output	± 4%
Repeatability: of rated output	± 1.0%
Zero balance: of rated output	± 2%
Bridge resistance: ohms nominal	350
Temperature range, compensated: °F	+ 30 to + 150
Temperature range, useable: °F	- 65 to + 200
Temperature effect on output: of reading per °F	± 0.003%
Temperature effect on zero: of rated output per °F	± 0.003%
Overload rating, safe: of rated capacity	150%
Excitation voltage, maximum: volts DC or AC rms	20
Insulation resistance, bridge/case: megohms at 50 VDC	1000
Belt thickness: (maximum) inches	0.10
Belt width: (maximum) inches	2.00
Weight: in ounces	8
Available capacities: pounds	3500

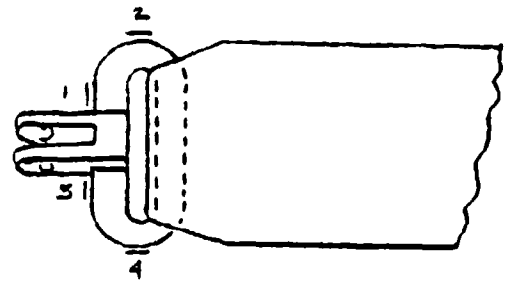
Figure A-11 - LOAD CELL SPECIFICATIONS



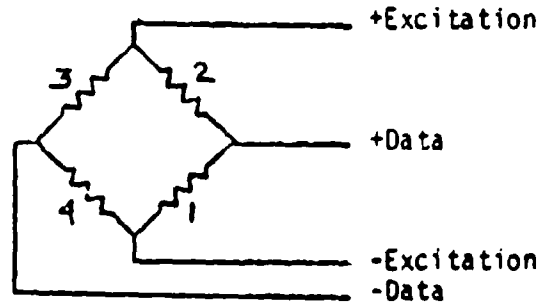
Right & Left
Lap Attachment



Crotch
Strap



Right & Left
Reflection



Notes:
*Strain Gages are Micro-Measurements Model EA-06-125BZ-350
*All units wired identical
*All 4 arms active

Figure A-12 - LOAD CELL SPECIFICATIONS (HARNESS HARDWARE)

Figure A-13 - HARNESS INSTRUMENTATION (PROPOSED, MODIFIED F-111)

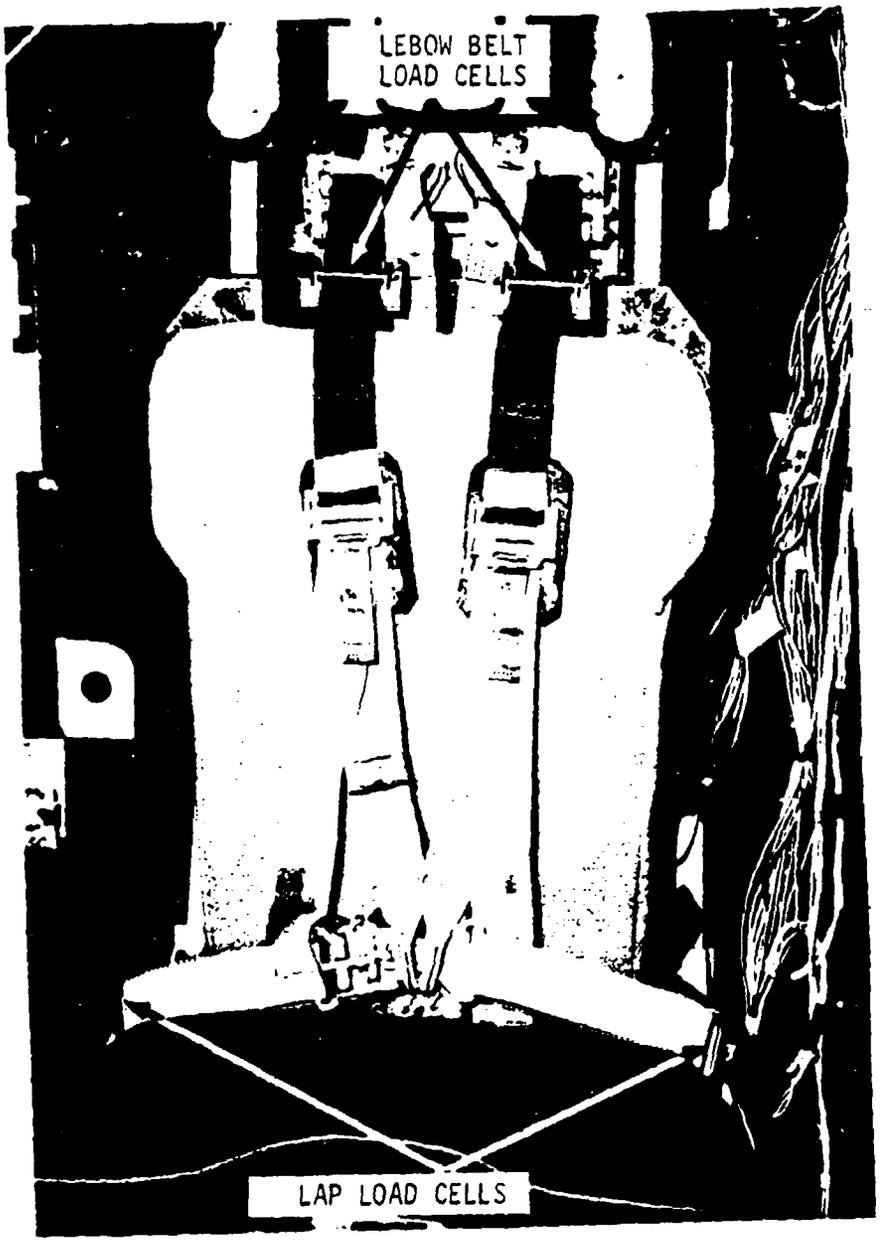


Figure A-14 - HARNESS INSTRUMENTATION (Conventional)

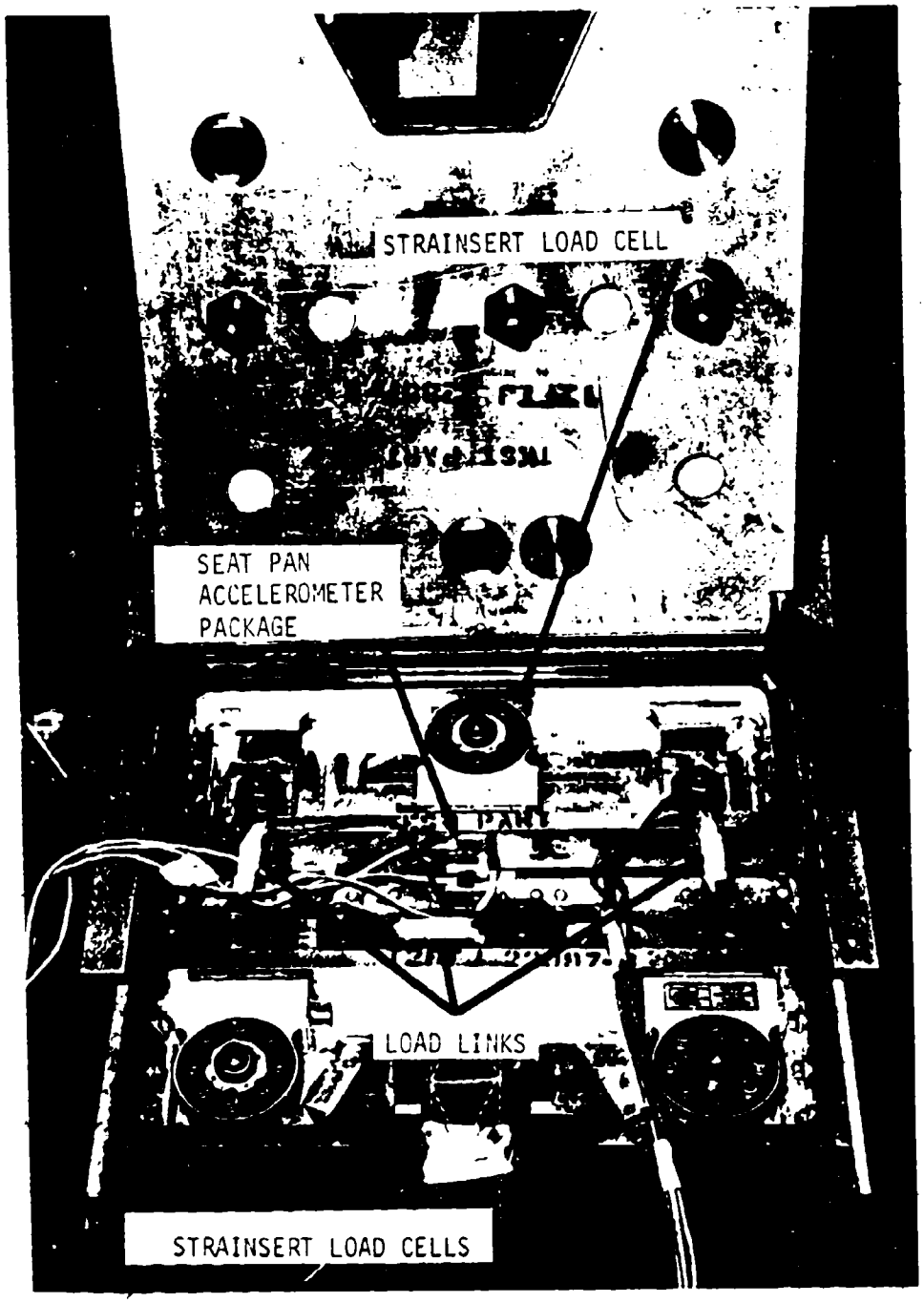


Figure A-15 - SEAT PAN INSTRUMENTATION

STRAINSERT
CALIBRATION DATA

U. S. Air Force Wright-Patterson AFB Dayton, Ohio Customer P.O. No. F33-601-76-86950	Q-3294 Strainsert Job No. Date: 10/16/76 Sign: CGH

Transducer: Universal Flat Load Cell, Model FL2.5U-2SPKT
2,500 lb. Capacity, 2 mv/v, 350 Ohms

Gages: EA-06-104ZA-175
Service Temp.: 150°F Max.
Calib. Temp.: 73°F

Type: C (Bendix PT02H-10-6P)
Ins. Res.: Over 10,000 megohms.
S/N: Q3294-6

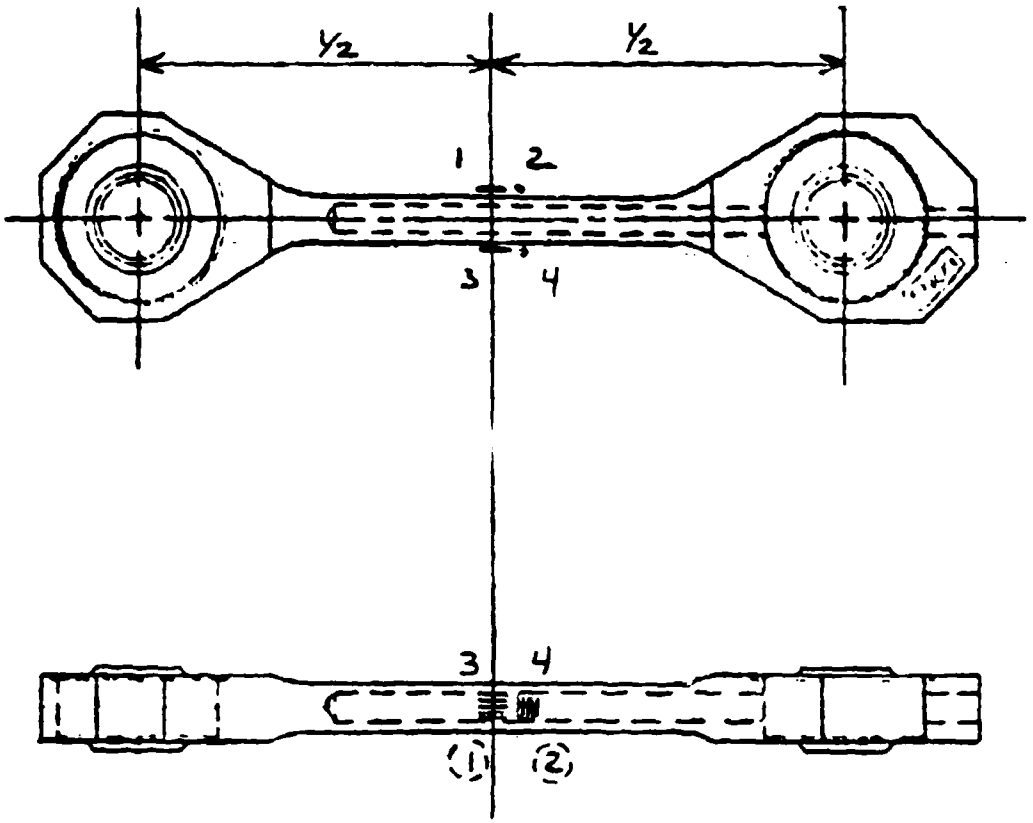
Load LBS.	Straight Line Signal Mv/v	Deviation, μv/v			Rep. μv/v
		Run 1	Run 2	Run 3	
0	0	0	0	0	0
500	0.400	-½	0	0	½
1,000	0.800	+½	+½	+½	0
1,500	1.200	0	0	0	0
2,000	1.600	-1	-1	-1	0
2,500	2.000	-½	-½	-½	0
2,000	1.600	-1	-½	-½	½
1,500	1.200	+1	+1	+1	0
1,000	0.800	+1½	+1½	+1½	0
500	0.400	+½	+1	+1	½
0	0	0	0	0	0
	Hysteresis	1	1	1	

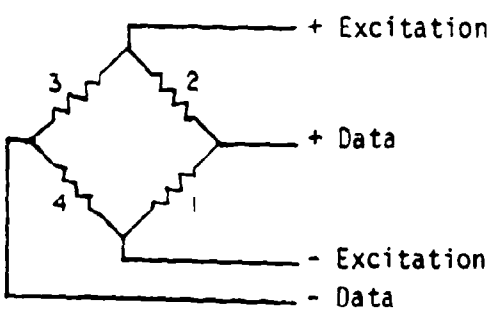
Calibration Analysis:

Non-Linearity:	1	parts in	2,000	=	.05%
Repetition					
Loading :	½	parts in	2,000	=	.03%
Unloading:	½	parts in	2,000	=	.03%
Zero Load:	0	parts in	2,000	=	--
Max. Load:	0	parts in	2,000	=	--
End Point :	½	parts in	2,000	=	.03%
Hysteresis :	1	parts in	2,000	=	.05%

Hold Down Bolts: 10-32NF; Torque = 6 ft. lb. lubricated

Figure A-16 - LOAD CELL SPECIFICATIONS





NOTES: *Strain Gages are Micro-Measurements Model EA-06-062TJ-350
*Z arms active

Figure A-17 - LOAD CELL SPECIFICATIONS (LOAD LINK)

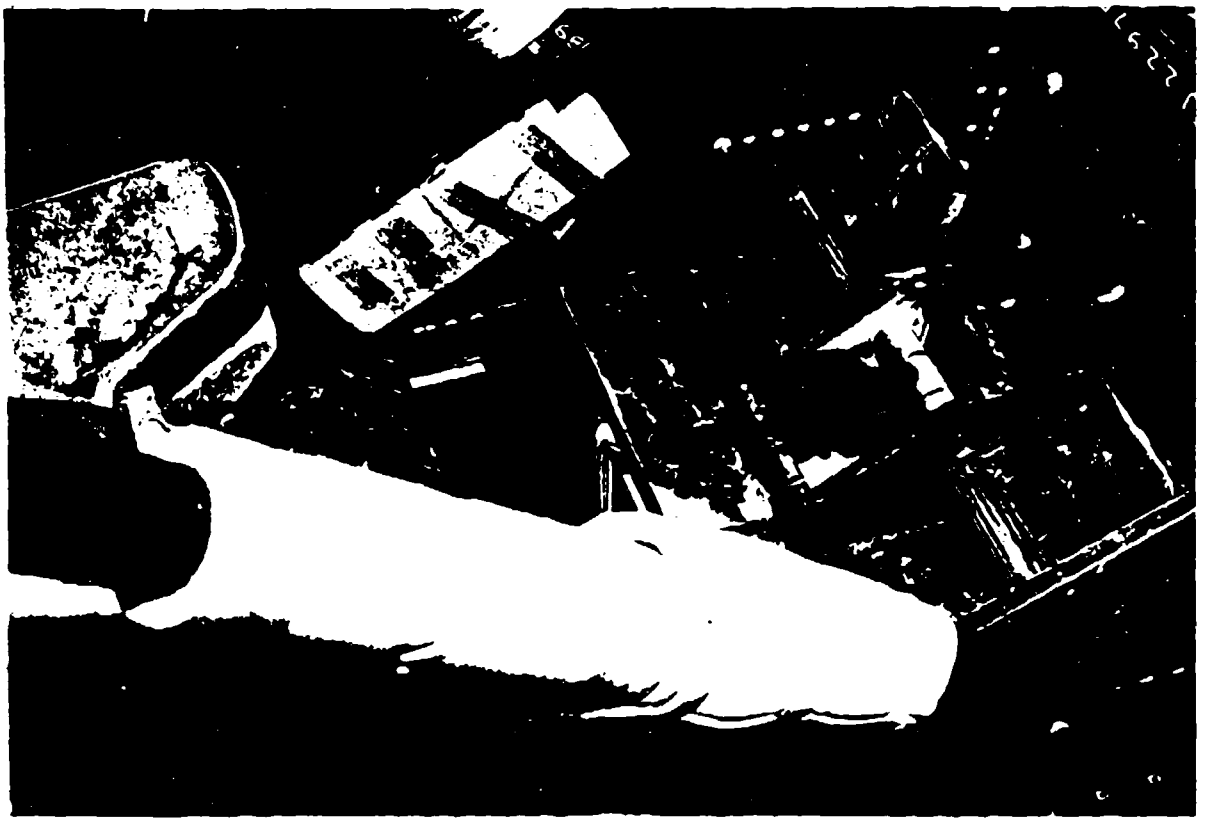
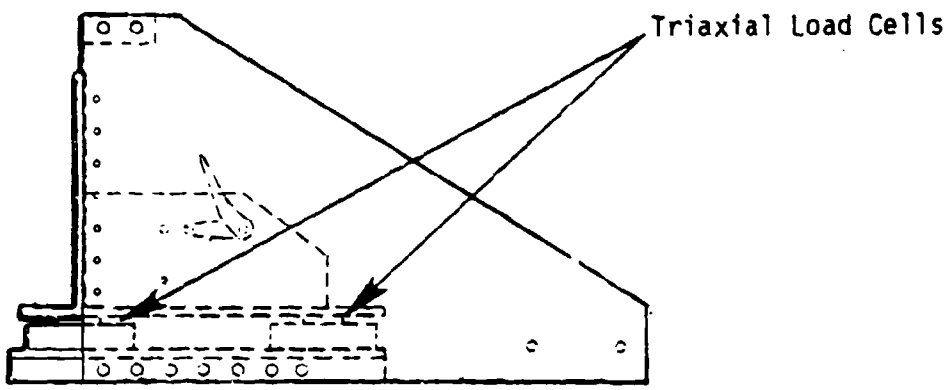


Figure A-18 - FOOT REST ASSEMBLY



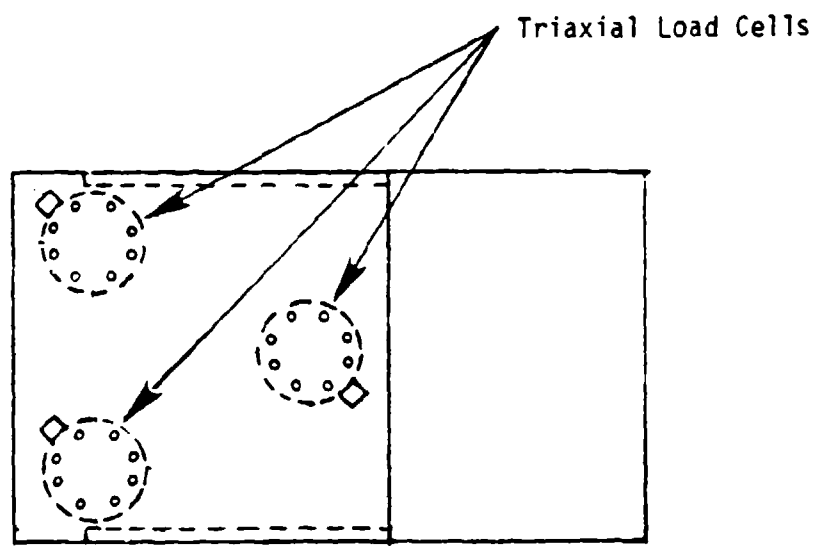
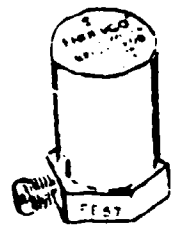


Figure A-19 - FOOT REST LOAD CELL LOCATIONS

2262A-200
2262CA-200

Damped, Overload Stops

PIEZORESISTIVE
ACCELEROMETERS



SPECIFICATIONS FOR MODEL **2262A-200 and 2262CA-200 ACCELEROMETERS**

	Models 2262A-200 (2262CA-200)*
DYNAMIC	
RANGE	±200 g to 200 g
OVERRANGE LIMITING	±300 to ±1 200 g
SENSITIVITY	2.5 mV/g typical (1.2 mV/g typical)
	2 mV/g minimum (1 mV/g minimum)
MOUNTED NATURAL FREQUENCY (AT 75°F)	7 000 Hz typical
FREQUENCY RESPONSE	±5% maximum 0 to 3 000 Hz at 75°F; -35%/10% typical at 0.200°F and 3 000 Hz
DAMPING RATIO	0.7 typical
TRANSVERSE SENSITIVITY	3% maximum
THERMAL SENSITIVITY SHIFT	
LINEARITY AND HYSTERESIS	±2% of reading, maximum, to 200 g
ELECTRICAL	
EXCITATION	10.00 Vdc
INPUT RESISTANCE (AT 75°F)	1 600 Ω typical (1 000 Ω typical)
OUTPUT RESISTANCE (AT 75°F)	1 200 Ω typical (1 000 Ω typical)
INSULATION RESISTANCE	100 GΩ minimum
ZERO MEASURAND OUTPUT	±25 mV maximum
ENVIRONMENTAL	
ACCELERATION LIMITS (In any direction)	0°F to +200°F
Static	2 000 g
Sinusoidal	1 000 g pk
Shock	2 000 g half sine pulse
TEMPERATURE	
Compensated	0°F to +200°F (-18°C to +93°C)
Nonoperating	-20°F to +220°F (-29°C to +104°C)
HUMIDITY	Sealed by glass to metal fusion and welding.

Figure A-20 - ACCELEROMETER SPECIFICATIONS

PROGRAM Head Rest Position Study DATE 1 July 80

VDT FACILITY RUN NO's 308-449

DATA POINT	TRANSDUCER MFG & MODEL	S/N	PRE CAL DATE	PRE CAL SENS mV/g	POST CAL DATE	POST CAL SENS mV/g	% CHANGE	COMMENTS
Carriage X	Endevco 2264-200	BX49	17 Mar 80	2.561	30 Sep 80	2.581	+.8	
Carriage Y	"	BV56	"	2.767	"	2.757	-.4	Tests 308-424 only - removed due to excessive zero shift.
Carriage Z	Endevco 2262A-200	FR42	15 May 80	4.138	"	4.147	+.2	
Head X	Endevco 2264-200	BP10	25 Jun 80	2.462	"	2.496	+1.4	
Head Y	Endevco 2264-200	BQ42	"	2.709	"	2.713	+.1	
Head Z	"	BQ51	"	2.550	"	2.553	+.1	
Chest X	Endevco 2264-150	BC26	"	2.782	29 Sep 80	2.786	+.1	
Chest Y	"	BB13	"	2.416	"	2.430	+.6	
Chest Z	"	2A20	"	2.577	"	2.619	+1.6	
Seat X	Endevco 2264-200	BV95	"	2.990	03 Oct 80	2.964	-.9	Tests 308-340 only - removed due to noise which was later traced to the amplifier.
Seat Y	"	BV41	"	3.280	"	3.298	+.5	
Seat Z	"	BN63	"	2.814	"	2.825	+.4	
Carriage Y	Endevco 2264-150	BB11	08 Sep 80	2.346	30 Sep 80	2.354	+.3	Tests 425-449 Only
Seat X	Endevco 2264-200	BV63	25 Jun 80	2.569	03 Oct 80	2.564	-.2	Tests 341-449 Only

Figure A-21 - PROGRAM CALIBRATIONS (PRE AND POST)

PROGRAM Head Rest Position Study DATE 1 July 80

VDT FACILITY RUN NO'S 308-449

DATA POINT	TRANSDUCER MFG & MODEL	S/N	PRE CAL DATE	PRE CAL SENS μV/lb	POST CAL DATE	POST CAL SENS μV/lb	% CHANGE	COMMENTS
Lf.Load Link X	MM EA-06-062-TJ-350	001	26 Jun 80	10.80	03 Oct 80	10.79	-.1	
Rt.Load Link X	"	002	"	10.05	"	10.11	+.6	
CenLoad Link Y	"	004	"	10.27	"	10.23	-.4	
Left Lap	MM EA-06-1258Z-350	13	"	14.93	02 Oct 80	15.10	+1.1	
Right Lap	"	14	"	13.71	"	13.66	-.4	
N-G Strap	"	143377	30 Jun 80	1.933	03 Oct 80	1.800	-6.9	
Lf Reflec.Strap	"	02-10	26 Jun 80	26.11	02 Oct 80	26.32	+.8	
Rt Reflec.Strap	"	01-3	"	34.29	"	34.04	-.7	
Lf Inert RL. Strap	"	363	30 Jun 80	8.01	"	7.86	-1.9	
Rt Inert RL. Strap	"	364	27 Jun 80	7.401	"	7.54	+1.9	
Left Lap	"	15	10 Jul 80	14.10	"	14.39	+2.1	
Right Lap	"	16	18 Aug 80	15.28	"	15.35	+.5	

Figure A-22 - PROGRAM CALIBRATIONS (PRE AND POST)

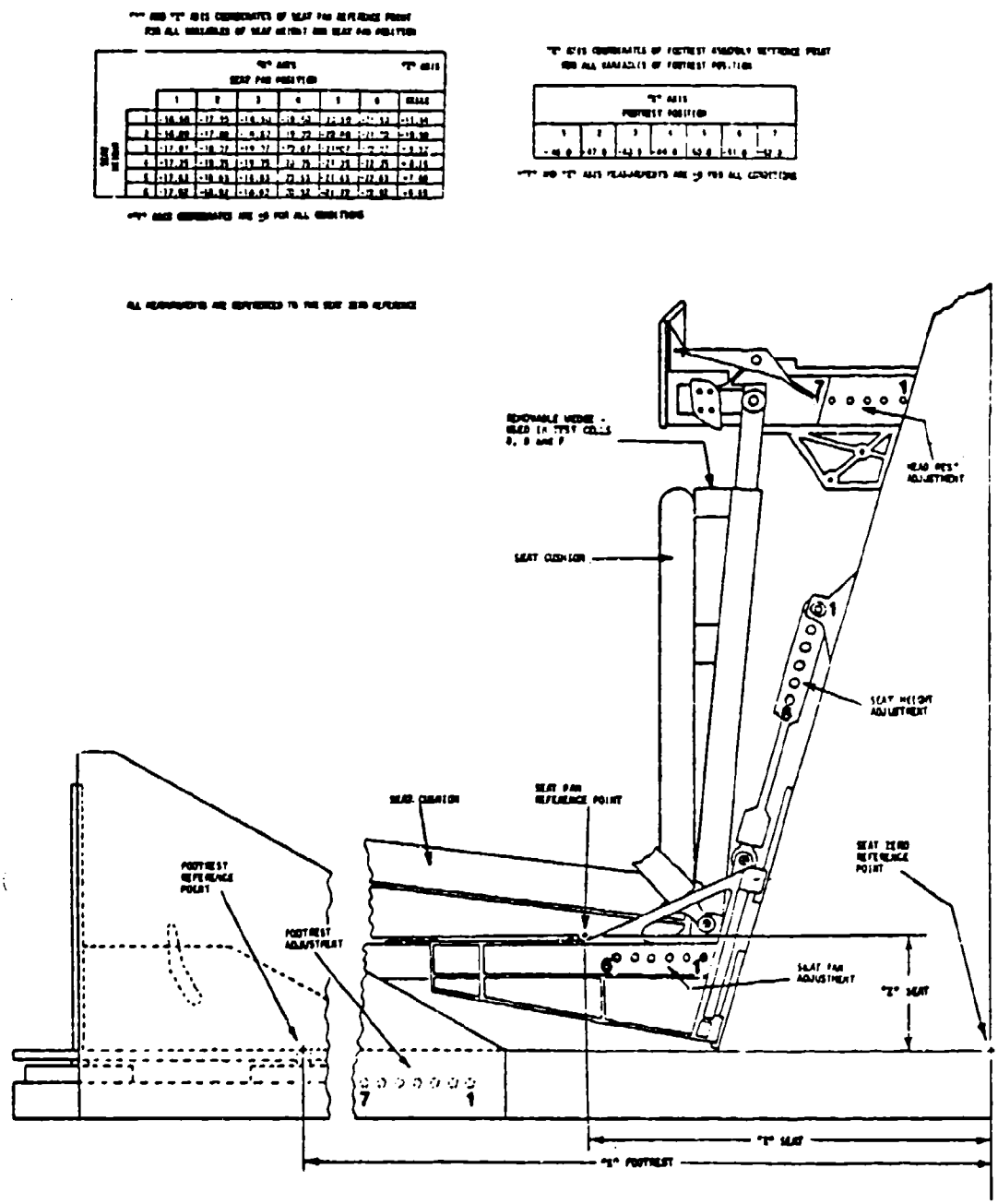


Figure A-23 - SEAT GEOMETRY

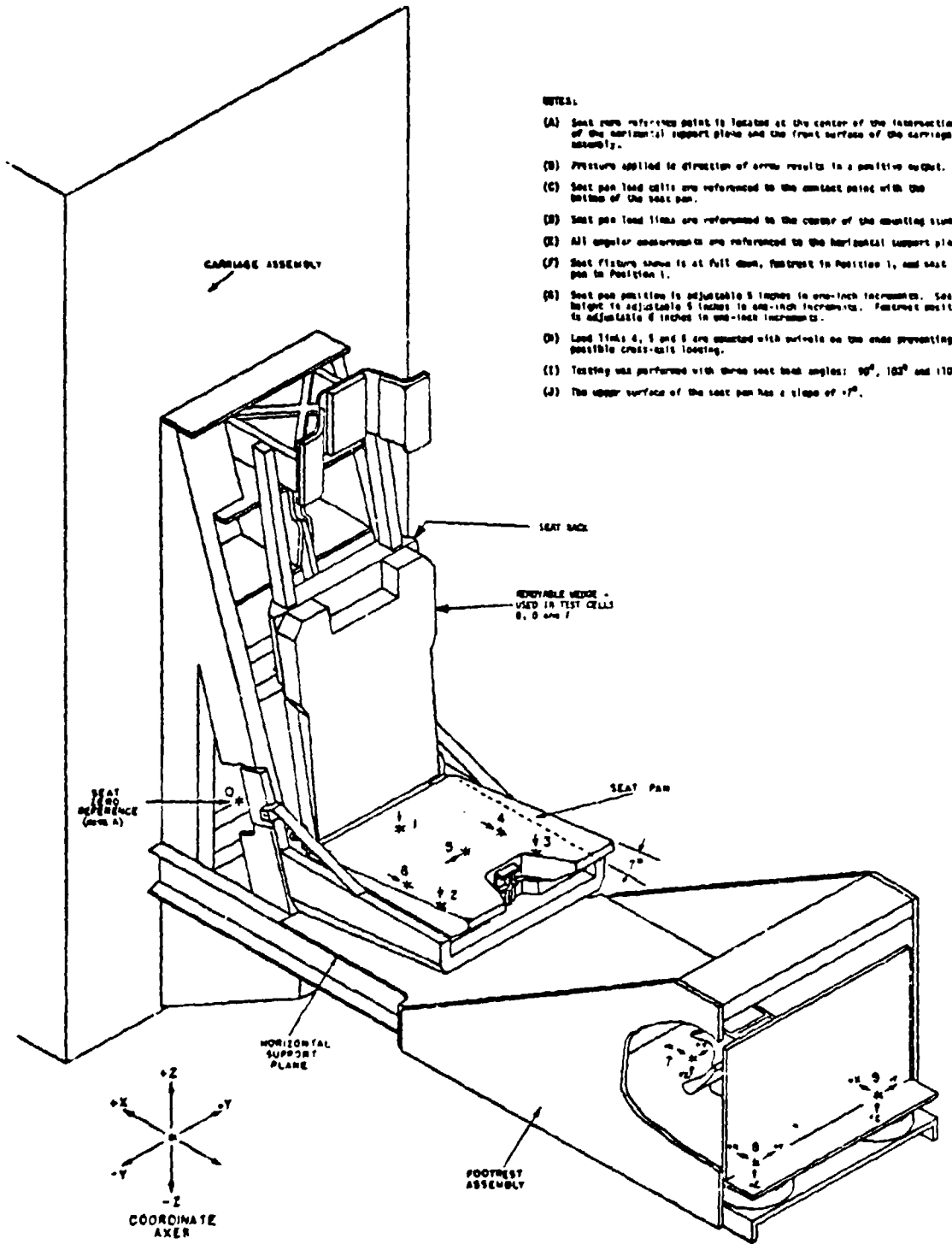


Figure A-24 - SEAT GEOMETRY

AUTOMATIC DATA ACQUISITION AND CONTROL SYSTEM

CARRIAGE DIGITAL DATA ACQUISITION SYSTEM EQUIPMENT

Figure A-25 is a photograph of the Carriage Digital Data Acquisition System. Figure A-26 shows the block diagram of the Carriage Digital Data Acquisition System. This system consists of four parts: the power conditioner, the signal conditioner and sensors, the encoder and the junction box. The power conditioner requires a 28 vdc, 4A power source and provides several regulated supplies. They are the +15 and -12 vdc (0.8A) supply for the signal conditioners, the 5 vdc and the 10 vdc bridge excitation voltages (1.2A total), and the 2.5 vdc signal output bias voltage (0.1A). The 28 vdc source also powers the pulse code modulator (PCM) encoder (0.24A).

The signal conditioner consists of 48 signal modules. Each module is capable of processing a sensor (transducer) signal which can be a voltage generating source or a bridge-type sensor. If a bridge-type sensor is used, the bridge excitation voltage is selectable from the 5V or the 10V source. By connecting the proper external resistors to the module input connector a half bridge is completed. A full or half bridge is balanced by connecting external resistors to its module input connector.

The signal conditioning module consists of a amplifier section and a filter section. The amplifier gain can be selected by inserting one of seven external gain plugs. These gains provide the capability of covering an input dynamic range from 50 mV up to 5 V. The filter section can be programmed by inserting one of four external filter plugs. These filter plugs are in accordance with the SAE recommended classes 60, 180, 600 and 1000.

The 48 channel data signals are time multiplexed and digitized via an encoder into 48 11-bit digital words. Two additional 11-bit synchronization (sync) words are added to the data frame. The 50-word frame is then sampled at a rate of 1000 samples/second. These serial digital data along with three additional synchronization pulse trains (bit sync, word sync, and frame sync) are connected to the computer room by four twisted pairs incorporated into a drag cable. They pass through a junction box to the digital computer interface to allow recording and processing.

PDP 11-34 DATA COLLECTION AND STORAGE

The PDP 11-34 minicomputer is the main control for all electronic data collection and storage functions. The block diagram of Figure A-27 shows the processor and its related equipment. All data transfer in the data collection system are under software control by the central processor unit. Serial data are constantly being received by the data formatter unit from the carriage data encoder. These data are converted by the data formatter from serial to parallel for input via a buffered data channel to computer memory for storage on disk. Finally, the data are transferred from disk to magnetic tape for permanement storage following the test event.

QUICK LOOK INERTIAL DATA

After each test, the data were sampled and checked. This check was made using the Single Channel ANalysis (SCAN) routine for the PDP 11-34 processor. This routine allows the operator to access and plot up to 2000 points of data for any of the 48 data channels. The operator selects the channel to be processed and enters its location description as well as the start and stop points to be processed. A maximum of 2000 milliseconds or 2000 data points may be accessed for each plot. The program converts the raw data into the appropriate units of measure and calculates the minimum and maximum values during the sample interval. If the sample is acceleration data, the velocity will also be calculated using an integration process.

An added optional feature is a digital smoothing routine which can smooth the data to remove any excess high frequency component that may be present.

FOOT REST AND SEAT PAN CORRECTION

Dynamic foot and seat pan loads were corrected by removing the effects of the foot support fixture and seat pan loading on supporting load cells.

A series of tests was conducted to determine the percentage of the total force resting on each cell. The weight assessed each load cell and multiplied by the carriage acceleration was subtracted from the acquired test data in the processing.

In practice, the load cell outputs are zeroed with the foot support fixture and seat pan weight resting on the load cells. During a drop, with no payload, the sum output of the load cells would reflect the weight of the fixture as a negative load (fixture weight removed from the load cell). The data were processed to remove this effect and thus reflect a zero output during a drop with no payload.

The final foot and seat pan loads were processed to provide corrected values which represent actual loads encountered by the human or dummy subjects.

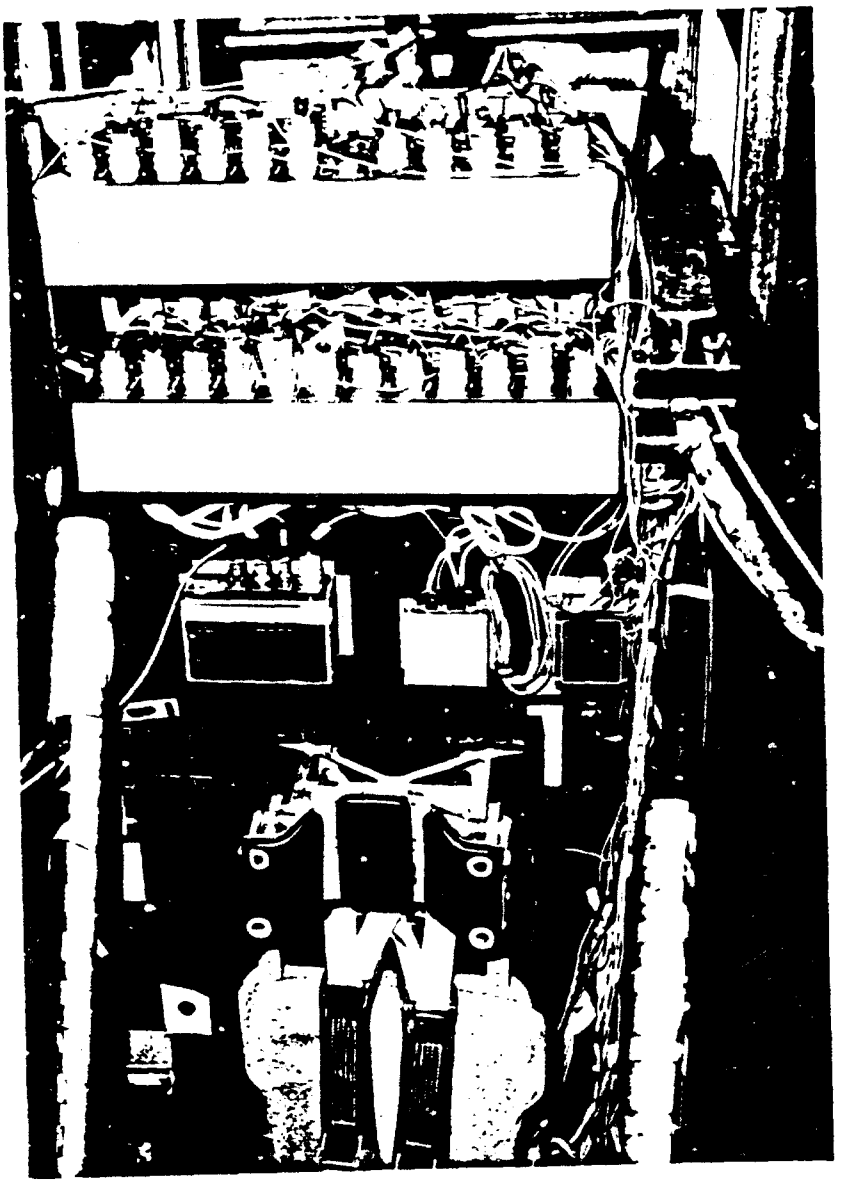


Figure A-25 - CARRIAGE DIGITAL DATA ACQUISITION SYSTEM

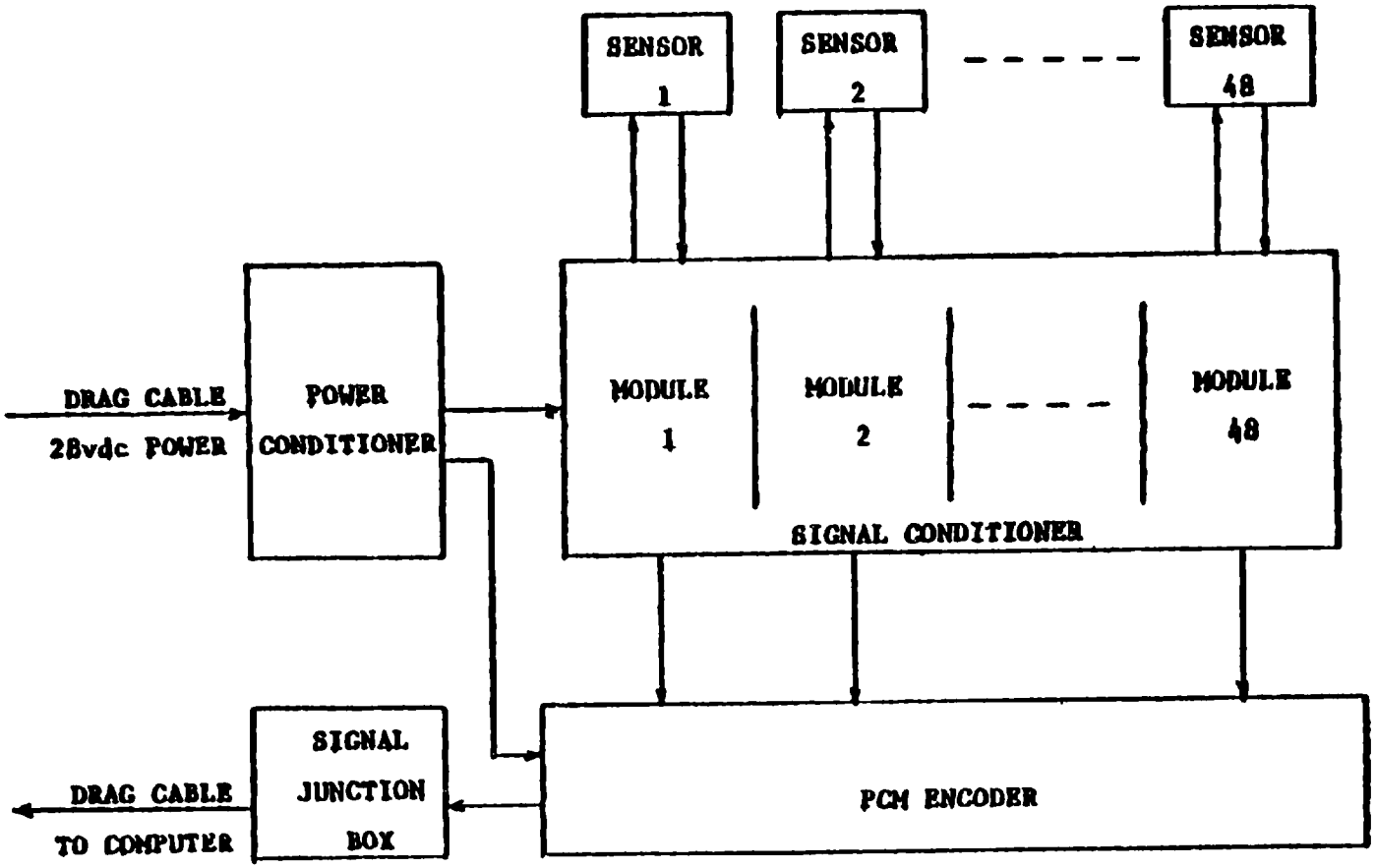


Figure A-26 - CARRIAGE DIGITAL DATA ACQUISITION SYSTEM BLOCK DIAGRAM

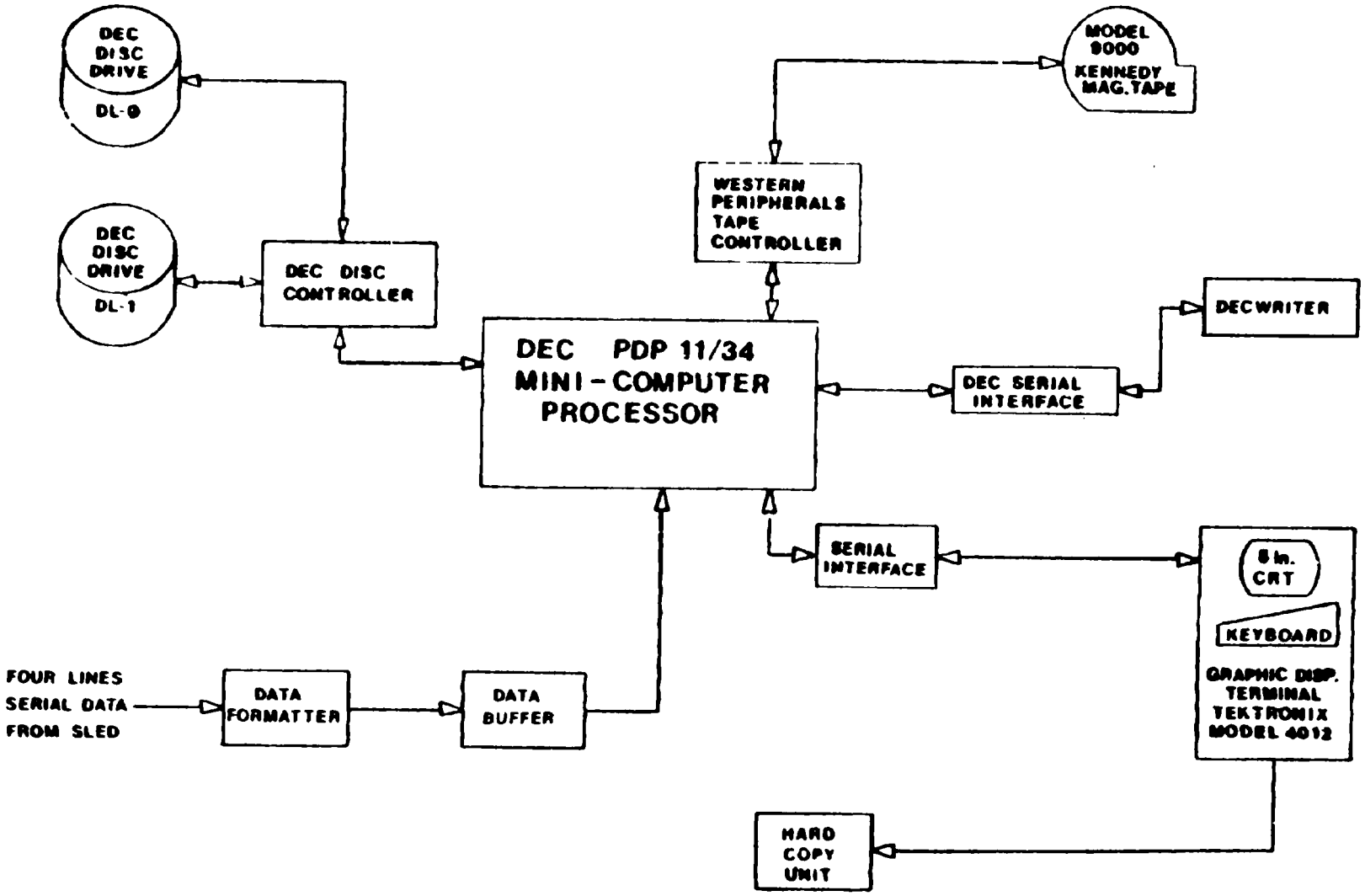


Figure A-27 - CENTRAL DATA ACQUISITION AND STORAGE SYSTEM

KINEMATIC DATA ACQUISITION SYSTEM

HIGH SPEED CAMERAS AND CONTROL

Kinematic data were acquired through the use of high speed 16mm cameras operating at a rate of 500 frames per second. The cameras were Teledyne Milliken Model DBM45 pin registered units which were capable of withstanding 25 G. Two cameras were mounted to the carriage, one to provide a frontal view and one to provide a right lateral view of the subject. During a test the cameras were started and stopped automatically by the Camera and Lighting Control Station which is part of the impact facility safety and control system. The cameras were started at a preset time in the test sequence and run for a period of 8 seconds.

AUTOMATIC FILM READER

The AFR subsystem was developed by Photo Digitizing Systems, Inc. It automatically extracts photo data, digitizes it and records it on magnetic tape. The subsystem consists of:

Film motion analyzer with 16mm projection head
Electronic scanning camera
Control Unit
Alphanumeric Cathode Ray Tube (CRT)
Line printer
Magnetic tape transport

The film reader recognizes quadrant or circular fiducial targets. It automatically tracks targets and extracts data for up to twelve targets per film frame at a minimum rate of one-half frame per second. Film may be processed through the reader manually or automatically.

Figure A-28 is a block diagram of the Automatic Film Reader System (AFR). The X-Y coordinate position of each target on each film frame is input to the computer and recorded on magnetic tape.

A NOVA 3/12 computer controls the AFR which contains 16K, 16-bit, words of core memory, a CRT terminal, and a magnetic tape transport with suitable interface. In addition, a parallel data link is provided between the NOVA 3/12 and the PDP 11/34.

An alphanumeric CRT (DGC 6052) automatically displays the AFR control information. The CRT display and its keyboard function are used as separate devices. The keyboard is a transmit-only device and the display is a receive-only device but has the additional capability of transmitting cursor position information on program request.

A hard copy device, LA36 Decwriter II, provides hard copies of the information presented on the 6052 CRT. The LA36 is medium-sized interaction terminal with a low-speed impact printer and a standard ASCII keyboard consisting of alphanumeric characters and non-printing system control codes.

Either the Decwriter or the 6052 CRT output may be assigned to the PDP 11/34A. Programs can also be established which can "down load" from the disc on the PDP 11/34A to the NOVA, or digital film data can be loaded on the PDP 11/34A for processing or disc storage.

QUICK LOOK KINEMATIC DATA

The Instar (Instant Analytical Replay) System is a high-performance video recorder and display device designed for the analysis of high speed motion. It is a compact, portable, fully transistorized instrument that combines the long recording capacity and instant replay features of video tape. The system records 120 frames/second with an effective shutter speed of 10us or less and will playback all recordings in real time, stop action, reverse slow motion, and variable slow motion (2%-15% of real time). Each of the frames is sequential and non-interlaced.

Instar incorporates two cameras and a special effects generator for the added flexibility of split screen. The simultaneous display of two events offers the precise evaluation of three dimensional problems

or the referencing of one physical event to an instrument (i.e., digital clock or oscilloscope). Other features include:

End of tape sensing
Foolproof logic control sequences
Dynamic braking
Interscene blanking
Video logic signal processing modules

The Instar System was utilized to record each impact event. This video tape was available for review by the test conductor and/or medical monitor immediately after the impact event.

TIMING REFERENCE

A 100 PPS timing signal was an intergral part of the Kinematic Data Acquisition System. The Camera and Lighting Control Station started the timing signal at T = 0. An event signal was generated less than one second after T = 0. This event signal performed two functions. It triggered a photo flash unit which marked the film frame at the beginning of the impact event. Second, it started the 100 PPS signal to the LED drivers, LM Dearing Model 2/3/3R. The LEDs, located in the high-speed cameras, were pulsed every 10 ms which produced a .75 ms timing bar on the edge of the film. The diagram of Figure A-29 shows the 100 PPS signal, the event signal and the LED driver signal. Figure A-30 illustrates the event and timing bar in relationship to the film.

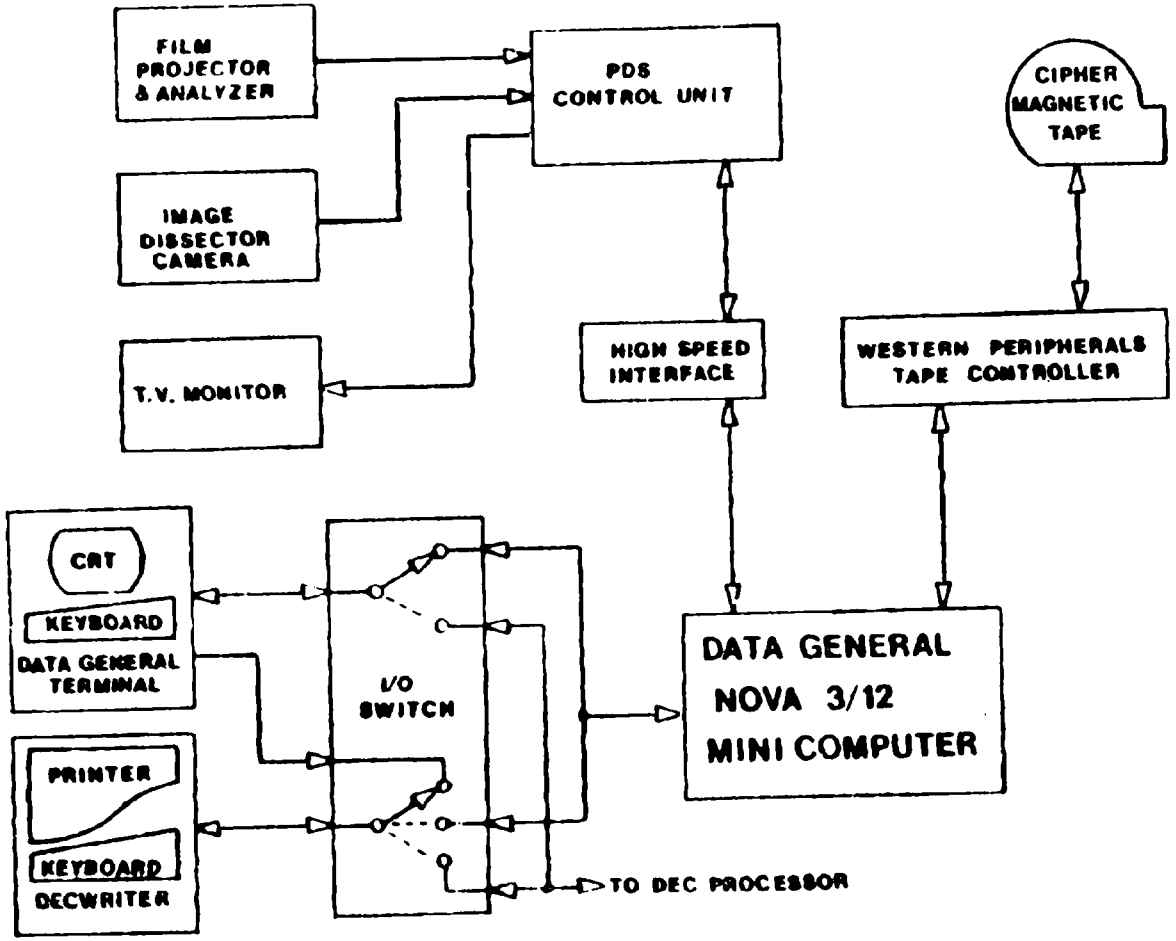


Figure A-28- AUTOMATIC FILM READER SYSTEM BLOCK DIAGRAM

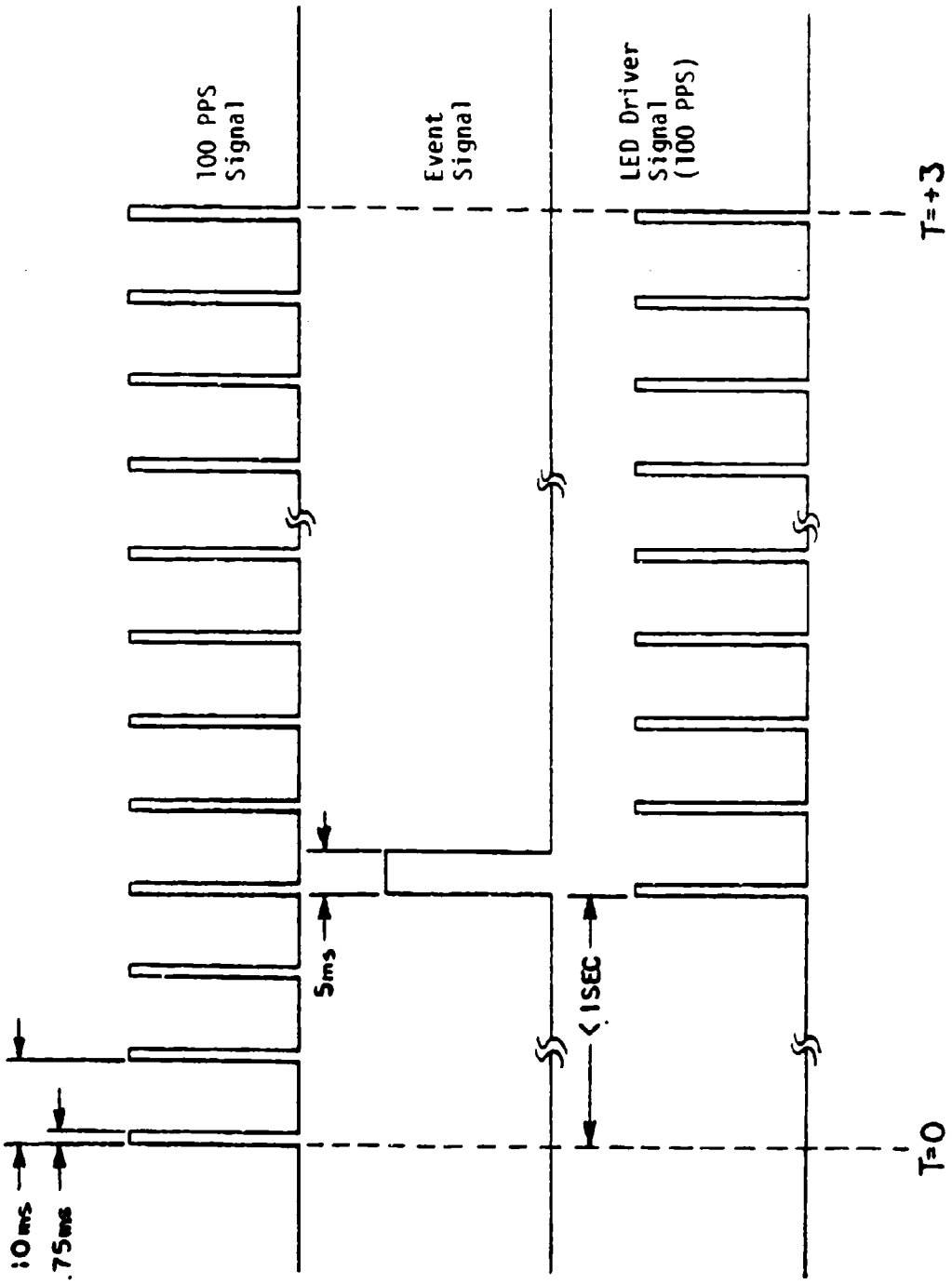


Figure A-29 - TIMING REFERENCE

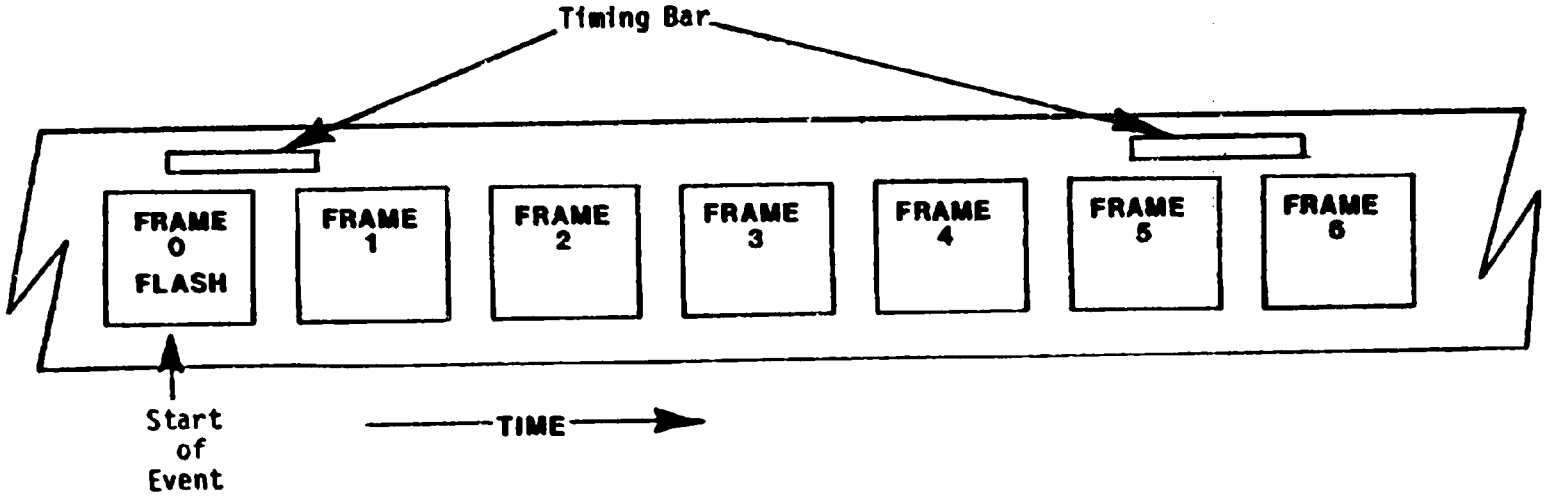


Figure A-30 - TIMING REFERENCE

APPENDIX B

SUMMARY OF ELECTRONIC DATA

The means and estimated standard deviations of all peak measured and computed parameters from each cell of experimental matrix are shown in Table B-1. (The cell designations are explained in the experimental design matrix, Table 1, in the body of the report.) In addition, the maximum and minimum values of each parameter are tabulated for each test conducted at the experimental level. The times at which these values were achieved during the impact are also tabulated. These data are grouped according to test condition. Finally, a set of analog data from each test condition is presented. To permit comparability among these data, the test results of the same subject, S-3, are shown in each test condition. This subject was selected because his tabulated maxima and minima in each of the three tests were not beyond 2.5 standard deviations of the mean and because the subject's body weight, standing height, and sitting height were close to the means of those anthropometric measurements for the sample under investigation. (See Table 2.)

All electronic data derived from this test program will be maintained by the Biomechanical Protection Branch of AFAMRL until this work unit is retired. These experimental results will eventually be recorded in a permanent data bank within the Laboratory.

TABLE B-1

SUMMARY OF ELECTRONICALLY MEASURED AND COMPUTED DATA

(Peak values are tabulated for velocity, accelerations and loads.)

MATRIX CELL	A		B	
RESTRAINT HARNESS	MODIFIED F-111		MODIFIED F-111	
BRACING POSITION	HANDS-ON-KNEES		HANDS-ON-KNEES	
HEADREST POSITION	FORWARD		AFT	
	(n = 14)		(n = 14)	
	MEAN	ST DEV	MEAN	ST DEV
CARRIAGE ACCELERATION (G)	10.6	0.18	10.5	0.11
CARRIAGE VELOCITY (ft/sec)	-25.7	0.13	-25.7	0.12
SEAT ACCELERATION (G)	10.6	0.18	10.6	0.18
CHEST ACCELERATION (G)				
-X axis	-1.56	0.75	-1.45	0.80
+X axis	4.29	1.66	4.21	1.46
+Z axis	18.3	4.14	19.5	4.23
Resultant	18.7	3.97	19.8	4.11
CHEST SEVERITY INDEX	31.1	6.86	34.1	6.84
HEAD ACCELERATION (G)				
-X axis	-4.70	1.02	-2.04	1.29
+X axis	1.04	0.95	1.97	1.16
+Z axis	13.1	1.03	13.1	0.98
Resultant	13.3	1.04	13.3	0.92
HEAD SEVERITY INDEX	19.7	2.15	20.2	2.14
STRAP LOADS (lb)				
Reflection Straps	95	23	94	21
Inertia Reel Straps	95	29	81	24
Total Shoulder Straps	181	54	165	48
Total Lap Belt	106	23	99	24
SEAT PAN LOADS (lb)				
-X axis	-263	69	-250	72
+Z axis	1640	235	1640	207
Resultant	1660	238	1660	210
FOOTREST LOADS (lb)				
-X axis	-536	149	-525	163
+Z axis	541	82	545	82
Resultant	710	165	719	161

TABLE B-1 (continued)

SUMMARY OF ELECTRONICALLY MEASURED AND COMPUTED DATA

(Peak values are tabulated for velocity, accelerations and loads.)

MATRIX CELL	C		D	
RESTRAINT HARNESS	MODIFIED F-111		MODIFIED F-111	
BRACING POSITION	HANDS-IN-LAP		HANDS-IN-LAP	
HEADREST POSITION	FORWARD		AFT	
	(n = 14)		(n = 14)	
	MEAN	ST DEV	MEAN	ST DEV
CARRIAGE ACCELERATION (G)	10.5	0.13	10.6	0.16
CARRIAGE VELOCITY (ft/sec)	-25.8	0.16	-25.7	0.15
SEAT ACCELERATION (G)	10.6	0.14	10.6	0.19
CHEST ACCELERATION (G)				
-X axis	-2.08	0.97	-2.08	0.89
+X axis	4.47	1.30	3.79	1.21
+Z axis	20.0	3.02	18.5	3.43
Resultant	20.4	2.91	18.8	3.43
CHEST SEVERITY INDEX	35.2	5.94	32.7	6.83
HEAD ACCELERATION (G)				
-X axis	-4.83	0.95	-2.01	1.53
+X axis	1.25	0.98	2.69	1.35
+Z axis	13.2	0.92	12.7	0.85
Resultant	13.4	0.92	13.0	0.96
HEAD SEVERITY INDEX	19.7	2.20	20.4	1.43
STRAP LOADS (lb)				
Reflection Straps	104	25	109	20
Inertia Reel Straps	112	28	105	25
Total Shoulder Straps	206	54	210	44
Total Lap Belt	92	27	95	17
SEAT PAN LOADS (lb)				
-X axis	-285	70	-269	63
+Z axis	1730	220	1710	212
Resultant	1760	222	1730	214
FOOTREST LOADS (lb)				
-X axis	-387	121	-398	90
+Z axis	465	74	484	75
Resultant	551	121	592	108

TABLE B-1 (continued)

SUMMARY OF ELECTRONICALLY MEASURED AND COMPUTED DATA

(Peak values are tabulated for velocity, accelerations and loads.)

MATRIX CELL	E		F	
RESTRAINT HARNESS	CONVENTIONAL		CONVENTIONAL	
BRACING POSITION	HANDS-IN-LAP		HANDS-IN-LAP	
HEADREST POSITION	FORWARD		AFT	
	(n = 13)		(n = 12)	
	MEAN	ST DEV	MEAN	ST DEV
CARRIAGE ACCELERATION (G)	10.5	0.16	10.5	0.11
CARRIAGE VELOCITY (ft/sec)	-25.8	0.14	-25.7	0.17
SEAT ACCELERATION (G)	10.6	0.17	10.7	0.10
CHEST ACCELERATION (G)				
-X axis	-2.28	0.94	-1.86	0.97
+X axis	3.93	1.43	4.95	1.62
+Z axis	20.2	3.31	19.5	2.83
Resultant	20.5	3.23	19.9	2.71
CHEST SEVERITY INDEX	41.1	6.75	40.8	5.47
HEAD ACCELERATION (G)				
-X axis	-4.44	1.13	-2.63	1.66
+X axis	1.56	1.31	2.62	1.76
+Z axis	14.7	1.32	14.8	1.44
Resultant	15.0	1.37	15.1	1.55
HEAD SEVERITY INDEX	24.3	2.75	26.7	3.12
STRAP LOADS (lb)				
Total Shoulder Straps	146	39	137	33
Total Lap Belt	108	23	116	27
SEAT PAN LOADS (lb)				
-X axis	-319	75	-308	63
+Z axis	1820	247	1790	282
Resultant	1850	253	1820	284
FOOTREST LOADS (lb)				
-X axis	-430	123	-430	100
+Z axis	476	81	473	59
Resultant	609	136	603	94

HEAD REST POS STUDY TEST: 399 SUBJ: D-1 WT: 212.0 G: 10 GP: 1 CELL: A

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	2070.00	59.00	48
CARRIAGE X	1.50	-0.68	3863.00	3856.00	36
CARRIAGE Y	0.80	-1.04	9869.00	3973.00	31
CARRIAGE Z	12.18	-0.31	3857.00	3639.00	1
CARRIAGE Z (SM)	10.31	-0.16	3857.00	3639.00	
CARRIAGE VEL	-0.87	-25.61	4156.00	3822.00	29
SEAT X	1.09	-1.07	3882.00	3832.00	32
SEAT Y	0.67	-0.97	3936.00	9960.00	93
SEAT Z	11.69	-0.24	3883.00	3692.00	34
SEAT Z (SM)	10.61	-0.15	3864.00	3674.00	
CHEST X	4.00	-2.61	3874.00	3911.00	5
CHEST Y	-0.16	-3.82	3843.00	3883.00	6
CHEST Z	15.95	-0.79	3879.00	3678.00	7
CHEST RES	14.88	0.39	3880.00	3807.00	
CHEST SI	28.20		3817.00	3965.00	
HEAD X	.44	-4.35	3694.00	3924.00	2
HEAD Y	2.50	0.01	3989.00	4022.00	3
HEAD Z	14.29	-1.21	3875.00	3988.00	4
HEAD RES	14.25	0.51	3875.00	3712.00	
HEAD SI	23.59		3825.00	4010.00	
HEAD HIC	16.56		3850.00	3926.00	
SHD REFL LF	43.23	12.70	3905.00	4097.00	14
SHD REEL LF	97.34	3.39	3961.00	3860.00	16
LF SHOULDER	71.94	21.60	3912.00	3860.00	
SHD REFL RT	57.67	18.89	3897.00	3977.00	15
SHD REEL RT	62.66	1.00	3905.00	3867.00	17
RT SHOULDER	119.84	33.15	3904.00	3859.00	
TOTAL SHLD REFL	100.41	35.24	3904.00	3977.00	
TOTAL SHLD REEL	87.60	5.68	3907.00	3861.00	
TOTAL SHOULDER	186.92	55.36	3905.00	3960.00	
TOTAL SHD / WT	0.88	0.26	3905.00	3860.00	
LF LAP BELT	56.74	26.91	3975.00	3858.00	8
RT LAP BELT	54.47	29.29	3919.00	3863.00	9
TOTAL LAP	108.97	57.66	3966.00	3865.00	
TOTAL LAP / WT	0.51	0.27	3966.00	3865.00	
CROTCH STRAP	155.65	-40.67	3969.00	3878.00	10
LF SEAT LNK X	56.55	-177.72	4104.00	3877.00	18
RT SEAT LNK X	37.42	-41.19	3928.00	3877.00	19
TOTAL SEAT X	76.61	-218.85	3942.00	3877.00	
SEAT LNK Y	86.07	-50.72	3928.00	3878.00	35
LF SEAT PAN Z	465.93	38.75	3876.00	3666.00	11
RT SEAT PAN Z	370.34	23.10	3879.00	3605.00	12
CT SEAT PAN Z	1186.20	118.75	3876.00	3692.00	13
TOTAL SEAT Z	2018.27	192.88	3876.00	3628.00	
TOTAL SEAT Z / WT	9.52	0.91	3876.00	3628.00	
RES SEAT FORCE	2030.11	201.72	3876.00	3628.00	
RES SEAT FORCE / WT	9.58	0.95	3876.00	3628.00	
LF FOOT X	-97.12	-285.78	4134.00	3874.00	20
RT FOOT X	-30.75	-280.12	4111.00	3875.00	23
CT FOOT X	-75.74	-384.31	4114.00	3877.00	26
TOTAL FOOT X	-155.36	-944.80	4111.00	3875.00	
LF FOOT Y	216.62	-27.08	3859.00	3967.00	21
RT FOOT Y	28.97	-228.39	4033.00	3876.00	24
CT FOOT Y	6.16	-65.93	3909.00	3871.00	27
TOTAL FOOT Y	28.31	-87.53	3997.00	3880.00	
LF FOOT Z	330.73	30.01	3860.00	3984.00	22
RT FOOT Z	348.51	39.19	3875.00	4179.00	25
CT FOOT Z	199.82	-153.55	3866.00	3811.00	28
TOTAL FOOT Z	744.50	4.45	3868.00	3811.00	
RES FOOT FORCE	1153.58	167.67	3876.00	4179.00	

HEAD REST POS STUDY TEST: 363 SUBJ: F-3 WT: 165.0 G: 10 GP: 1 CELL: A

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	1517.00	1923.00	48
CARRIAGE X	1.78	-1.54	3830.00	3843.00	36
CARRIAGE Y	0.45	-1.18	3868.00	3814.00	31
CARRIAGE Z	12.19	-0.25	3861.00	3750.00	1
CARRIAGE Z (SM)	10.42	-0.09	3862.00	3749.00	
CARRIAGE VEL	-0.89	-25.72	4193.00	3826.00	29
SEAT X	2.41	-1.48	3828.00	3841.00	32
SEAT Y	0.87	-1.07	3826.00	3837.00	33
SEAT Z	11.14	-0.28	3867.00	3654.00	34
SEAT Z (SM)	10.28	-0.17	3868.00	3763.00	
CHEST X	2.36	-2.35	3841.00	3911.00	5
CHEST Y	0.19	-1.69	3936.00	3865.00	6
CHEST Z	17.36	-0.95	3890.00	3766.00	7
CHEST RES	17.48	0.95	3890.00	4181.00	
CHEST SI	91.60		3827.00	3965.00	
HEAD X	1.34	-3.29	3871.00	3922.00	2
HEAD Y	2.36	-0.41	4087.00	3895.00	3
HEAD Z	11.97	-1.40	3880.00	3634.00	4
HEAD RES	12.01	0.78	3881.00	4116.00	
HEAD SI	16.42		3839.00	3948.00	
HEAD HIC	13.63		3856.00	3929.00	
SHD REFL LF	60.29	17.25	3917.00	4092.00	14
SHD REEL LF	58.01	5.08	3913.00	3884.00	16
LF SHOULDER	114.88	36.44	3914.00	3882.00	
SHD REFL RT	71.57	31.30	3901.00	3963.00	15
SHD REEL RT	87.16	15.34	3905.00	3874.00	17
RT SHOULDER	156.16	60.87	3904.00	3873.00	
TOTAL SHLD REFL	126.45	61.58	3903.00	4100.00	
TOTAL SHLD REEL	130.98	22.62	3911.00	3874.00	
TOTAL SHOULDER	251.87	100.56	3909.00	3874.00	
TOTAL SHD / WT	1.53	0.61	3909.00	3874.00	
LF LAP BELT	53.33	14.59	3974.00	3871.00	8
RT LAP BELT	47.53	15.74	3971.00	3872.00	9
TOTAL LAP	100.12	30.40	3973.00	3872.00	
TOTAL LAP / WT	0.61	0.18	3973.00	3872.00	
CROTCH STRAP	90.45	-27.49	3977.00	3876.00	10
LF SEAT LNK X	38.42	-181.46	3975.00	3883.00	18
RT SEAT LNK X	29.44	-87.48	3835.00	3876.00	19
TOTAL SEAT X	42.19	-267.77	3768.00	3876.00	
SEAT LNK Y	49.68	-58.67	3936.00	3884.00	35
LF SEAT PAN Z	414.99	18.00	3864.00	3631.00	11
RT SEAT PAN Z	309.34	5.27	3878.00	3604.00	12
CT SEAT PAN Z	820.43	50.34	3864.00	9690.00	13
TOTAL SEAT Z	1534.20	88.36	3884.00	9604.00	
TOTAL SEAT Z / WT	9.30	0.54	3884.00	3604.00	
RES SEAT FORCE	1556.65	97.20	3864.00	3604.00	
RES SEAT FORCE / WT	9.43	0.59	3884.00	3604.00	
LF FOOT X	0.25	-189.61	3831.00	3899.00	20
RT FOOT X	28.32	-163.77	3831.00	3888.00	23
CT FOOT X	21.95	-197.18	3831.00	3874.00	26
TOTAL FOOT X	50.52	-543.43	3831.00	3889.00	
LF FOOT Y	156.79	-25.77	3872.00	4111.00	21
RT FOOT Y	25.38	-163.84	9700.00	3863.00	24
CT FOOT Y	24.01	-38.29	3831.00	3838.00	27
TOTAL FOOT Y	30.39	-63.62	3049.00	3883.00	
LF FOOT Z	195.27	-32.45	3880.00	3840.00	22
RT FOOT Z	230.57	15.69	3881.00	3840.00	25
CT FOOT Z	188.74	-155.02	3830.00	3822.00	28
TOTAL FOOT Z	527.22	-120.56	3881.00	3821.00	
RES FOOT FORCE	728.44	169.74	3881.00	3797.00	

HEAD REST POS STUDY TEST: 398 SUBJ: F-2 WT: 160.0 G: 10 GP: 1 CELL: A

DATA ID	MAX	MIN	T1	T2	CM
10V EXT PWR	10.05	9.97	2573.00	760.00	48
CARRIAGE X	1.49	-0.76	3834.00	3840.00	36
CARRIAGE Y	1.00	-1.06	3835.00	3810.00	31
CARRIAGE Z	12.47	-0.14	3828.00	3676.00	1
CARRIAGE Z (SM)	10.67	-0.05	3828.00	3679.00	
CARRIAGE VEL	-1.09	-25.77	4185.00	3789.00	29
SEAT X	0.92	-1.12	3793.00	3840.00	32
SEAT Y	0.92	-1.26	3795.00	9802.00	33
SEAT Z	11.85	-0.28	3834.00	3657.00	34
SEAT Z (SM)	10.69	-0.20	3834.00	3658.00	
CHEST X	3.15	-1.13	3851.00	3885.00	5
CHEST Y	0.39	-3.46	3839.00	3854.00	6
CHEST Z	24.11	-1.42	3855.00	3755.00	7
CHEST RES	24.51	0.77	3855.00	3789.00	
CHEST SI	40.47		3799.00	3916.00	
HEAD X	.11	-4.69	3755.00	3877.00	2
HEAD Y	1.29	-2.14	3966.00	3846.00	3
HEAD Z	19.72	-0.82	3846.00	3654.00	4
HEAD RES	13.94	0.59	3846.00	4146.00	
HEAD SI	21.04		3799.00	3945.00	
HEAD HIC	16.49		3822.00	3894.00	
SHD REFL LF	25.05	7.48	3844.00	4100.00	14
SHD REEL LF	28.90	4.19	3902.00	3987.00	16
LF SHOULDER	44.33	13.98	3901.00	3966.00	
SHD REFL RT	44.49	16.75	3870.00	4069.00	15
SHD REEL RT	50.57	8.76	3926.00	3841.00	17
RT SHOULDER	83.49	33.46	3873.00	4099.00	
TOTAL SHLD REFL	68.17	25.33	3871.00	4077.00	
TOTAL SHLD REEL	73.93	16.17	3929.00	3986.00	
TOTAL SHOULDER	116.03	49.80	3928.00	3986.00	
TOTAL SHD / WT	0.73	0.31	3928.00	3986.00	
LF LAP BELT	47.58	19.58	3939.00	3839.00	8
RT LAP BELT	60.52	34.69	3948.00	3838.00	9
TOTAL LAP	106.65	54.33	3939.00	3838.00	
TOTAL LAP / WT	0.67	0.34	3939.00	3838.00	
CROTCH STRAP	82.24	-82.50	3933.00	3847.00	10
LF SEAT LNK X	28.39	-213.36	3926.00	3846.00	18
RT SEAT LNK X	7.90	-128.16	3602.00	9850.00	19
TOTAL SEAT X	19.97	-339.18	3619.00	3847.00	
SEAT LNK Y	59.82	-69.61	3909.00	3844.00	35
LF SEAT PAN Z	458.96	24.71	3847.00	3601.00	11
RT SEAT PAN Z	403.93	27.24	3848.00	3608.00	12
CT SEAT PAN Z	739.41	43.98	3851.00	3619.00	13
TOTAL SEAT Z	1583.65	107.80	3847.00	3601.00	
TOTAL SEAT Z / WT	9.96	0.67	3847.00	3601.00	
RES SEAT FORCE	1630.68	111.23	3847.00	3501.00	
RES SEAT FORCE / WT	10.19	0.70	3847.00	3601.00	
LF FOOT X	-4.39	-113.79	3793.00	3845.00	20
RT FOOT X	-9.55	-154.95	3793.00	3847.00	23
CT FOOT X	-24.01	-214.52	3794.00	3846.00	26
TOTAL FOOT X	-40.64	-481.47	3793.00	3846.00	
LF FOOT Y	152.75	-25.44	3830.00	3800.00	21
RT FOOT Y	20.50	-202.24	4099.00	3838.00	24
CT FOOT Y	48.70	-12.71	3830.00	3907.00	27
TOTAL FOOT Y	57.00	-67.54	3608.00	3837.00	
LF FOOT Z	228.49	26.82	3830.00	3786.00	22
RT FOOT Z	225.81	10.61	3838.00	3916.00	25
CT FOOT Z	209.54	-47.05	3834.00	3600.00	28
TOTAL FOOT Z	597.93	32.46	3831.00	3785.00	
RES FOOT FORCE	710.80	110.31	3839.00	4186.00	

HEAD REST POS STUDY TEST: 391 SUBJ: G- WT: 159.0 G: 10 GP: 2 CELL: A

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.04	9.96	1238.00	1939.00	48
CARRIAGE X	1.67	-1.02	3846.00	3790.00	36
CARRIAGE Y	0.63	-0.75	3847.00	3794.00	31
CARRIAGE Z	11.94	-0.21	3838.00	3743.00	1
CARRIAGE Z (SM)	10.72	-0.10	3839.00	3641.00	
CARRIAGE VEL	-1.05	-25.73	4129.00	3791.00	29
SEAT X	1.91	-1.62	3846.00	3851.00	32
SEAT Y	0.93	-1.09	3815.00	3810.00	33
SEAT Z	11.19	-0.23	3843.00	3652.00	34
SEAT Z (SM)	10.51	-0.17	3846.00	3653.00	
CHEST X	5.78	-1.86	3863.00	3893.00	5
CHEST Y	1.60	-1.83	3851.00	3881.00	6
CHEST Z	20.86	-1.02	3877.00	3605.00	7
CHEST RES	20.91	0.42	3877.00	3632.00	
CHEST SI	32.47		3801.00	3940.00	
HEAD X	0.48	-5.71	3802.00	3900.00	2
HEAD Y	1.48	-0.05	3947.00	3868.00	3
HEAD Z	12.89	-1.08	3859.00	3665.00	4
HEAD RES	12.99	0.71	3859.00	4105.00	
HEAD SI	21.32		3811.00	3965.00	
HEAD HIC	16.77		3834.00	3917.00	
SHD REFL LF	64.44	19.62	3883.00	3954.00	14
SHD REEL LF	50.30	4.47	3889.00	3846.00	16
LF SHOULDER	111.19	33.30	3887.00	3977.00	
SHD REFL RT	46.94	20.46	3886.00	3949.00	15
SHD REEL RT	55.96	1.72	3894.00	3851.00	17
RT SHOULDER	97.60	30.46	3892.00	3840.00	
TOTAL SHLD REFL	110.22	41.17	3884.00	3939.00	
TOTAL SHLD REEL	103.98	9.11	3892.00	3849.00	
TOTAL SHOULDER	206.34	67.57	3890.00	3839.00	
TOTAL SHD / WT	1.30	0.42	3890.00	3839.00	
LF LAP BELT	88.13	24.08	4075.00	3849.00	8
RT LAP BELT	82.45	24.12	4086.00	3849.00	9
TOTAL LAP	169.33	48.20	4086.00	3849.00	
TOTAL LAP / WT	1.06	0.30	4086.00	3849.00	
CROTCH STRAP	45.20	-66.29	4098.00	3861.00	10
LF SEAT LNK X	41.42	-173.28	3704.00	3852.00	18
RT SEAT LNK X	7.14	-114.10	3680.00	3853.00	19
TOTAL SEAT X	40.50	-287.37	3680.00	3853.00	
SEAT LNK Y	60.76	-72.41	3952.00	3866.00	35
LF SEAT PAN Z	640.86	67.91	3861.00	3635.00	11
RT SEAT PAN Z	613.97	41.64	3860.00	3652.00	12
CT SEAT PAN Z	371.10	29.71	3869.00	3616.00	13
TOTAL SEAT Z	1616.36	156.24	3860.00	3654.00	
TOTAL SEAT Z / WT	10.17	0.98	3860.00	3654.00	
RES SEAT FORCE	1641.74	162.14	3860.00	3654.00	
RES SEAT FORCE / WT	10.33	1.02	3860.00	3654.00	
LF FOOT X	-12.48	-160.75	3805.00	3856.00	20
RT FOOT X	2.38	-132.44	3803.00	3856.00	23
CT FOOT X	-15.37	-174.57	3804.00	3866.00	26
TOTAL FOOT X	-36.04	-462.40	3805.00	3856.00	
LF FOOT Y	139.07	-25.14	3850.00	4116.00	21
RT FOOT Y	18.92	-128.11	3831.00	3840.00	24
CT FOOT Y	19.44	-93.07	3807.00	3858.00	27
TOTAL FOOT Y	28.06	-53.19	3867.00	3861.00	
LF FOOT Z	184.68	-28.12	3865.00	3796.00	22
RT FOOT Z	198.88	10.66	3865.00	3796.00	25
CT FOOT Z	124.48	-109.94	3805.00	3796.00	28
TOTAL FOOT Z	442.55	-127.41	3863.00	3796.00	
RES FOOT FORCE	603.53	99.52	3865.00	3927.00	

HEAD REST POS STUDY TEST: N20 SUBJ: G-2 WT: 119.0 G: 10 GP: 2 CELL: A

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.04	9.96	6.00	933.00	48
CARRIAGE X	1.51	-1.30	3839.00	3832.00	36
CARRIAGE Y	0.48	-1.16	3932.00	3786.00	31
CARRIAGE Z	13.06	-0.15	3833.00	3610.00	1
CARRIAGE Z (SM)	11.00	-0.06	3833.00	3608.00	
CARRIAGE VEL	-1.02	-25.45	4163.00	3782.00	29
SEAT X	1.25	-1.37	3796.00	3832.00	32
SEAT Y	0.94	-1.50	3798.00	3807.00	33
SEAT Z	12.15	-0.28	3839.00	3647.00	34
SEAT Z (SM)	10.87	-0.18	3840.00	3647.00	
CHEST X	3.42	-1.16	3858.00	3892.00	5
CHEST Y	-0.08	-1.46	3829.00	3889.00	6
CHEST Z	14.36	-0.96	3864.00	3651.00	7
CHEST RES	14.53	0.71	3864.00	3794.00	
CHEST SI	26.19		3797.00	4047.00	
HEAD X	0.54	-4.60	3662.00	3891.00	2
HEAD Y	0.97	-0.73	3926.00	3855.00	3
HEAD Z	12.65	-1.07	3855.00	3768.00	4
HEAD RES	12.68	0.51	3856.00	4121.00	
HEAD SI	18.47		3803.00	3935.00	
HEAD HIC	16.06		3830.00	3901.00	
SHD REFL LF	44.24	12.61	3885.00	4095.00	14
SHD REEL LF	38.35	4.02	3891.00	3858.00	16
LF SHOULDER	79.89	29.75	3889.00	4080.00	
SHD REFL RT	38.25	19.88	3886.00	4098.00	15
SHD REEL RT	55.89	3.44	3889.00	3844.00	17
RT SHOULDER	93.70	28.28	3889.00	3844.00	
TOTAL SHLD REFL	82.49	32.93	3886.00	4096.00	
TOTAL SHLD REEL	93.86	8.60	3890.00	3858.00	
TOTAL SHOULDER	173.59	63.18	3889.00	3846.00	
TOTAL SHD / WT	1.46	0.53	3889.00	3846.00	
LF LAP BELT	43.77	2.03	3932.00	3842.00	8
RT LAP BELT	46.60	9.36	3935.00	3842.00	9
TOTAL LAP	90.28	11.39	3935.00	3842.00	
TOTAL LAP / WT	0.76	0.10	3935.00	3842.00	
CROTCH STRAP	102.85	-14.91	3932.00	3849.00	10
LF SEAT LNK X	56.21	-123.37	3950.00	3849.00	18
RT SEAT LNK X	55.41	-20.67	3805.00	3862.00	19
TOTAL SEAT X	89.98	-141.66	3796.00	3856.00	
SEAT LNK Y	43.61	-52.64	3927.00	3845.00	35
LF SEAT PAN Z	305.58	16.02	3850.00	3634.00	11
RT SEAT PAN Z	337.45	12.53	3856.00	3660.00	12
CT SEAT PAN Z	415.47	95.81	3858.00	3608.00	13
TOTAL SEAT Z	1047.95	86.63	3858.00	3607.00	
TOTAL SEAT Z / WT	8.81	0.73	3858.00	3607.00	
RES SEAT FORCE	1058.21	114.44	3858.00	3607.00	
RES SEAT FORCE / WT	8.89	0.96	3858.00	3607.00	
LF FOOT X	-16.40	-140.27	4194.00	3846.00	20
RT FOOT X	-17.15	-188.09	4174.00	3848.00	23
CT FOOT X	-31.57	-230.13	4168.00	3848.00	26
TOTAL FOOT X	-65.12	-558.49	4197.00	3848.00	
LF FOOT Y	120.56	-32.30	3835.00	3807.00	21
RT FOOT Y	17.46	-150.26	3897.00	3844.00	24
CT FOOT Y	61.73	-3.24	3873.00	3923.00	27
TOTAL FOOT Y	51.44	-42.00	3813.00	3807.00	
LF FOOT Z	219.78	15.77	3836.00	4060.00	22
RT FOOT Z	193.24	16.14	3837.00	4170.00	25
CT FOOT Z	155.96	-97.88	3840.00	3791.00	28
TOTAL FOOT Z	502.68	7.70	3842.00	3791.00	
RES FOOT FORCE	646.32	77.97	3837.00	4170.00	

HEAD REST POS STUDY TEST: 382 SUBJ: K-1 WT: 178.0 G: 10 GP: 2 CELL: A

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	3054.00	2.00	48
CARRIAGE X	1.33	-1.11	3826.00	3803.00	36
CARRIAGE Y	0.99	-0.83	3826.00	3947.00	31
CARRIAGE Z	12.14	-0.18	3822.00	3666.00	1
CARRIAGE Z (SM)	10.38	-0.06	3836.00	3681.00	
CARRIAGE VEL	-1.08	-25.54	4200.00	3790.00	29
SEAT X	1.28	-1.09	3794.00	3802.00	32
SEAT Y	0.99	-1.36	3790.00	3846.00	33
SEAT Z	11.22	-0.26	3829.00	3659.00	34
SEAT Z (SM)	10.42	-0.17	3830.00	3660.00	
CHEST X	6.18	-1.09	3847.00	3895.00	5
CHEST Y	0.85	-1.27	3833.00	3789.00	6
CHEST Z	18.39	-0.69	3838.00	3734.00	7
CHEST RES	19.00	0.62	3856.00	4077.00	
CHEST SI	32.67		3787.00	3930.00	
HEAD X	0.32	-6.52	3719.00	3867.00	2
HEAD Y	1.35	-1.39	3770.00	3844.00	3
HEAD Z	12.93	-1.18	3841.00	3652.00	4
HEAD RES	13.51	0.75	3844.00	4190.00	
HEAD SI	20.24		3797.00	3928.00	
HEAD HIC	16.08		3823.00	3884.00	
SHD REFL LF	37.97	8.24	3854.00	4098.00	14
SHD REEL LF	25.14	6.47	3928.00	4005.00	16
LF SHOULDER	49.26	20.13	3856.00	4015.00	
SHD REFL RT	35.23	14.24	3840.00	4047.00	15
SHD REEL RT	32.15	0.58	3910.00	3823.00	17
RT SHOULDER	53.21	23.18	3910.00	3960.00	
TOTAL SHLD REFL	71.09	23.84	3845.00	4088.00	
TOTAL SHLD REEL	54.44	7.98	3915.00	3824.00	
TOTAL SHOULDER	95.83	45.29	3865.00	3960.00	
TOTAL SHD / WT	0.54	0.25	3865.00	3960.00	
LF LAP BELT	52.38	30.46	3902.00	3829.00	8
RT LAP BELT	66.04	36.84	3923.00	4017.00	9
TOTAL LAP	117.75	71.44	3922.00	4006.00	
TOTAL LAP / WT	0.66	0.40	3922.00	4006.00	
CROTCH STRAP	65.42	-79.26	3921.00	3850.00	10
LF SEAT LNK X	39.34	-160.40	3775.00	3843.00	18
RT SEAT LNK X	4.50	-129.72	3649.00	3845.00	19
TOTAL SEAT X	33.58	-288.88	3688.00	3844.00	
SEAT LNK Y	46.38	-84.37	3908.00	3848.00	35
LF SEAT PAN Z	633.19	50.23	3846.00	3607.00	11
RT SEAT PAN Z	649.82	50.10	3846.00	3623.00	12
CT SEAT PAN Z	677.69	42.45	3846.00	3605.00	13
TOTAL SEAT Z	1960.70	151.40	3846.00	3607.00	
TOTAL SEAT Z / WT	11.02	0.85	3846.00	3607.00	
RES SEAT FORCE	1982.09	154.31	3846.00	3607.00	
RES SEAT FORCE / WT	11.14	0.87	3846.00	3607.00	
LF FOOT X	-8.53	-166.85	3704.00	3841.00	20
RT FOOT X	8.34	-133.53	3791.00	3841.00	23
CT FOOT X	0.77	-208.52	3940.00	3841.00	26
TOTAL FOOT X	-17.18	-508.90	3941.00	3841.00	
LF FOOT Y	154.10	-22.34	3833.00	3800.00	21
RT FOOT Y	18.92	-178.98	3962.00	3824.00	24
CT FOOT Y	35.26	-47.51	3792.00	3828.00	27
TOTAL FOOT Y	67.33	-97.17	3817.00	3843.00	
LF FOOT Z	196.81	-18.88	3825.00	3801.00	22
RT FOOT Z	244.58	-19.12	3824.00	3952.00	25
CT FOOT Z	181.57	-96.29	3817.00	3802.00	28
TOTAL FOOT Z	546.82	-77.24	3825.00	3801.00	
RES FOOT FORCE	707.32	60.05	3834.00	4074.00	

HEAD REST POS STUDY TEST: 396 SUBJ: M-2 WT: 163.0 G: 10 GP: 1 CELL: A

DATA ID	MAX	MIN	T1	T2	CM
10V EXT PWR	10.06	9.97	2293.00	537.00	48
CARRIAGE X	1.14	-0.73	3913.00	3886.00	36
CARRIAGE Y	0.08	-0.90	3895.00	3612.00	31
CARRIAGE Z	12.43	-0.27	3887.00	3698.00	1
CARRIAGE Z (SM)	10.54	-0.07	3888.00	3698.00	
CARRIAGE VEL	-1.17	-25.50	4160.00	3838.00	29
SEAT X	1.42	-1.05	3851.00	3866.00	32
SEAT Y	0.62	-1.26	3850.00	3863.00	33
SEAT Z	11.45	-0.31	3894.00	3716.00	34
SEAT Z (SM)	10.60	-0.17	3894.00	3715.00	
CHEST X	2.57	-2.55	3910.00	3946.00	5
CHEST Y	2.01	-1.97	3900.00	3911.00	6
CHEST Z	21.73	-0.81	3920.00	3777.00	7
CHEST RES	21.74	0.49	3920.00	3844.00	
CHEST SI	38.23		3851.00	4113.00	
HEAD X	2.59	-3.90	3904.00	3956.00	2
HEAD Y	0.99	-1.91	3770.00	3911.00	3
HEAD Z	11.98	-1.23	3909.00	3650.00	4
HEAD RES	12.35	0.39	3909.00	4183.00	
HEAD SI	16.43		3867.00	4045.00	
HEAD HIC	12.23		3885.00	3941.00	
SHD REFL LF	50.91	13.73	3957.00	4098.00	14
SHD REEL LF	40.75	3.20	3951.00	3910.00	16
LF SHOULDER	89.14	29.34	3950.00	4098.00	
SHD REFL RT	42.33	25.46	3974.00	4041.00	15
SHD REEL RT	64.22	4.87	3982.00	3909.00	17
RT SHOULDER	106.34	38.46	3974.00	4048.00	
TOTAL SHLD REFL	88.72	41.29	3957.00	4097.00	
TOTAL SHLD REEL	99.70	8.21	3952.00	3909.00	
TOTAL SHOULDER	187.25	72.98	3956.00	4098.00	
TOTAL SHD / WT	1.15	0.45	3956.00	4098.00	
LF LAP BELT	25.92	1.83	3999.00	3894.00	8
RT LAP BELT	51.02	8.67	4003.00	3890.00	9
TOTAL LAP	76.25	11.41	4002.00	3894.00	
TOTAL LAP / WT	0.47	0.07	4002.00	3894.00	
CROTCH STRAP	122.14	-47.31	3984.00	3909.00	10
LF SEAT LNK X	67.51	-126.47	3986.00	3909.00	18
RT SEAT LNK X	55.17	-57.61	3862.00	3909.00	19
TOTAL SEAT X	71.83	-184.08	3988.00	3909.00	
SEAT LNK Y	70.44	-43.35	3966.00	3908.00	35
LF SEAT PAN Z	375.46	28.28	3909.00	3819.00	11
RT SEAT PAN Z	357.94	25.17	3910.00	3607.00	12
CT SEAT PAN Z	893.84	65.97	3909.00	3616.00	13
TOTAL SEAT Z	1621.90	135.18	3909.00	3625.00	
TOTAL SEAT Z / WT	9.95	0.83	3909.00	3625.00	
RES SEAT FORCE	1632.87	145.88	3909.00	3625.00	
RES SEAT FORCE / WT	10.02	0.89	3909.00	3625.00	
LF FOOT X	-26.18	-148.24	4005.00	3906.00	20
RT FOOT X	-31.67	-222.88	4195.00	3907.00	23
CT FOOT X	-82.29	-274.59	4195.00	3907.00	26
TOTAL FOOT X	-153.70	-635.96	4195.00	3906.00	
LF FOOT Y	157.85	-28.20	3890.00	3976.00	21
RT FOOT Y	18.25	-199.17	3699.00	3898.00	24
CT FOOT Y	35.33	-42.10	3927.00	3902.00	27
TOTAL FOOT Y	45.66	-100.57	3867.00	3898.00	
LF FOOT Z	274.17	30.84	3890.00	3845.00	22
RT FOOT Z	279.44	53.71	3907.00	4196.00	25
CT FOOT Z	146.29	-130.15	3896.00	3845.00	28
TOTAL FOOT Z	560.97	28.35	3890.00	3845.00	
RES FOOT FORCE	823.69	180.68	3907.00	4196.00	

HEAD REST POS STUDY TEST: 364 SUBJ: M11 WT: 155.0 G: 10 GP: 1 CELL: A

DATA ID	MAX	MIN	T1	T2	CM
10V EXT PWR	10.05	9.96	2240.00	1342.00	48
CARRIAGE X	1.33	-1.01	3910.00	3879.00	36
CARRIAGE Y	0.89	-0.75	3907.00	3853.00	31
CARRIAGE Z	12.46	-0.36	3901.00	3683.00	1
CARRIAGE Z (SM)	10.72	-0.15	3902.00	3684.00	
CARRIAGE VEL	-0.99	-25.67	4155.00	3875.00	29
SEAT X	1.34	-1.21	3868.00	3916.00	32
SEAT Y	0.56	-0.97	3866.00	3928.00	33
SEAT Z	11.27	-0.26	3908.00	3689.00	34
SEAT Z (SM)	10.61	-0.20	3909.00	3710.00	
CHEST X	3.51	-2.17	3925.00	3957.00	5
CHEST Y	0.37	-1.53	3898.00	3916.00	6
CHEST Z	18.12	-0.85	3935.00	3714.00	7
CHEST RES	18.18	0.49	3935.00	3860.00	
CHEST SI	30.97		3863.00	4012.00	
HEAD X	1.90	-4.66	3909.00	3956.00	2
HEAD Y	0.96	-1.86	3790.00	3925.00	3
HEAD Z	13.09	-1.02	3919.00	3725.00	4
HEAD RES	13.27	0.49	3919.00	4137.00	
HEAD SI	18.08		3873.00	4027.00	
HEAD HIC	13.62		3899.00	3943.00	
SHD REFL LF	61.75	17.63	3950.00	4008.00	14
SHD REEL LF	83.51	6.37	3955.00	3910.00	16
LF SHOULDER	122.35	30.27	3954.00	3911.00	
SHD REFL RT	55.10	23.87	3950.00	3995.00	15
SHD REEL RT	48.12	3.44	3958.00	3925.00	17
RT SHOULDER	99.81	35.44	3957.00	3903.00	
TOTAL SHLD REFL	116.85	43.15	3950.00	4007.00	
TOTAL SHLD REEL	110.66	11.99	3957.00	3912.00	
TOTAL SHOULDER	221.82	67.07	3955.00	3903.00	
TOTAL SHD / WT	1.43	0.43	3955.00	3903.00	
LF LAP BELT	59.20	20.86	4021.00	3911.00	8
RT LAP BELT	60.40	18.46	4022.00	3905.00	9
TOTAL LAP	119.54	39.43	4022.00	3911.00	
TOTAL LAP / WT	0.77	0.25	4022.00	3911.00	
CROTCH STRAP	38.89	-47.97	4004.00	3912.00	10
LF SEAT LNK X	48.97	-176.66	4123.00	3919.00	18
RT SEAT LNK X	26.36	-117.76	3869.00	3917.00	19
TOTAL SEAT X	39.19	-293.85	3732.00	3917.00	
SEAT LNK Y	69.13	-54.96	3978.00	3924.00	35
LF SEAT PAN Z	508.45	31.78	3919.00	3619.00	11
RT SEAT PAN Z	451.71	22.98	3923.00	3620.00	12
CT SEAT PAN Z	673.95	48.03	3926.00	3618.00	13
TOTAL SEAT Z	1606.59	111.87	3927.00	3519.00	
TOTAL SEAT Z / WT	10.37	0.72	3927.00	3619.00	
RES SEAT FORCE	1629.64	116.10	3927.00	3619.00	
RES SEAT FORCE / WT	10.51	0.75	3927.00	3619.00	
LF FOOT X	2.60	-156.52	3999.00	3919.00	20
RT FOOT X	8.51	-155.39	3868.00	3930.00	23
CT FOOT X	9.27	-157.99	3875.00	3930.00	26
TOTAL FOOT X	10.64	-461.90	3999.00	3919.00	
LF FOOT Y	131.81	-28.91	3913.00	3877.00	21
RT FOOT Y	13.60	-149.69	3731.00	3921.00	24
CT FOOT Y	25.90	-19.49	3889.00	3981.00	27
TOTAL FOOT Y	47.09	-66.02	3870.00	3922.00	
LF FOOT Z	192.53	-18.10	3930.00	3876.00	22
RT FOOT Z	221.07	-12.40	3926.00	3872.00	25
CT FOOT Z	133.43	-96.15	3911.00	3879.00	28
TOTAL FOOT Z	475.90	-81.72	3926.00	3858.00	
RES FOOT FORCE	639.24	11.35	3930.00	4011.00	

HEAD REST POS STUDY TEST: 395 SUBJ: M10 WT: 140.0 G: 10 GP: 2 CELL: A

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	209.00	1427.00	48
CARRIAGE X	1.40	-0.98	3861.00	3867.00	36
CARRIAGE Y	0.96	-0.42	3860.00	3843.00	31
CARRIAGE Z	12.31	-0.16	3854.00	3827.00	1
CARRIAGE Z (SM)	10.53	-0.07	3869.00	3764.00	
CARRIAGE VEL	-1.00	-25.58	4106.00	3818.00	29
SEAT X	1.30	-1.60	3862.00	3867.00	32
SEAT Y	0.71	-0.77	3913.00	3894.00	33
SEAT Z	11.68	-0.22	3860.00	3671.00	34
SEAT Z (SM)	10.68	-0.14	3860.00	3671.00	
CHEST X	7.25	-1.36	3875.00	3911.00	5
CHEST Y	0.12	-2.83	3902.00	3885.00	6
CHEST Z	19.69	-1.26	3886.00	3670.00	7
CHEST RES	20.27	0.67	3886.00	3820.00	
CHEST SI	33.25		3823.00	3961.00	
HEAD X	2.68	-2.58	3868.00	3924.00	2
HEAD Y	1.37	-1.10	3926.00	3873.00	3
HEAD Z	14.40	-4.69	3871.00	3976.00	4
HEAD RES	14.63	0.48	3871.00	4099.00	
HEAD SI	22.32		3829.00	3965.00	
HEAD HIC	17.01		3850.00	3893.00	
SHD REFL LF	24.64	5.19	3900.00	4080.00	14
SHD REEL LF	25.54	2.61	3924.00	3888.00	16
LF SHOULDER	41.74	10.83	3921.00	3967.00	
SHD REFL RT	30.12	15.39	3899.00	3960.00	15
SHD REEL RT	41.67	4.64	3909.00	3854.00	17
RT SHOULDER	67.51	26.64	3909.00	3855.00	
TOTAL SHLD REFL	54.53	23.04	3900.00	3959.00	
TOTAL SHLD REEL	56.47	9.03	3917.00	3872.00	
TOTAL SHOULDER	102.29	49.03	3910.00	3978.00	
TOTAL SHD / WT	0.73	0.35	3910.00	3978.00	
LF LAP BELT	36.26	11.64	3953.00	3854.00	8
RT LAP BELT	42.67	13.91	3990.00	3858.00	9
TOTAL LAP	77.83	27.52	3990.00	3860.00	
TOTAL LAP / WT	0.56	0.20	3990.00	3860.00	
CROTCH STRAP	46.96	-42.90	3962.00	3854.00	10
LF SEAT LNK X	47.23	-174.95	4070.00	3869.00	18
RT SEAT LNK X	23.52	-77.31	3918.00	3868.00	19
TOTAL SEAT X	54.71	-250.40	4089.00	3869.00	
SEAT LNK Y	61.91	-60.36	3929.00	3870.00	35
LF SEAT PAN Z	386.08	16.11	3870.00	3607.00	11
RT SEAT PAN Z	356.83	10.59	3868.00	3676.00	12
CT SEAT PAN Z	804.23	36.17	3871.00	3688.00	13
TOTAL SEAT Z	1541.13	71.70	3870.00	3676.00	
TOTAL SEAT Z / WT	11.01	0.51	3870.00	3676.00	
RES SEAT FORCE	1561.68	77.46	3870.00	3676.00	
RES SEAT FORCE / WT	11.15	0.55	3870.00	3676.00	
LF FOOT X	-11.75	-176.30	3637.00	3868.00	20
RT FOOT X	11.63	-96.75	3953.00	3873.00	23
CT FOOT X	-3.45	-204.70	3818.00	3873.00	26
TOTAL FOOT X	-18.71	-475.94	3817.00	3873.00	
LF FOOT Y	152.00	-15.71	3865.00	4177.00	21
RT FOOT Y	25.52	-132.44	4143.00	3874.00	24
CT FOOT Y	18.97	-55.78	3979.00	3861.00	27
TOTAL FOOT Y	38.17	-59.54	4145.00	3874.00	
LF FOOT Z	213.95	3.70	3857.00	3643.00	22
RT FOOT Z	186.67	4.43	3858.00	3826.00	25
CT FOOT Z	169.77	-33.64	3862.00	3671.00	28
TOTAL FOOT Z	502.76	0.75	3858.00	3648.00	
RES FOOT FORCE	611.03	67.10	3874.00	3625.00	

HEAD REST POS STUDY TEST: 366 SUBJ: M13 WT: 170.0 G: 10 GP: 1 CELL: A

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	4068.00	2490.00	48
CARRIAGE X	1.11	-0.98	3857.00	3832.00	36
CARRIAGE Y	0.63	-0.60	3859.00	3800.00	31
CARRIAGE Z	12.10	-0.24	3850.00	3664.00	1
CARRIAGE Z (SM)	10.45	-0.10	3866.00	3664.00	
CARRIAGE VEL	-0.89	-25.82	4149.00	3820.00	29
SEAT X	2.41	-1.13	3821.00	3830.00	32
SEAT Y	0.75	-1.16	3819.00	3878.00	33
SEAT Z	11.14	-0.31	3857.00	3771.00	34
SEAT Z (SM)	10.45	-0.21	3858.00	3681.00	
CHEST X	2.93	-1.49	3868.00	3904.00	5
CHEST Y	1.02	-3.29	3862.00	3868.00	6
CHEST Z	19.43	-1.48	3883.00	3743.00	7
CHEST RES	19.46	0.77	3883.00	4140.00	
CHEST SI	29.84		3823.00	3952.00	
HEAD X	0.08	-4.67	3671.00	3894.00	2
HEAD Y	1.81	-0.81	3956.00	3865.00	3
HEAD Z	14.09	-0.90	3868.00	3692.00	4
HEAD RES	14.33	0.83	3868.00	4189.00	
HEAD SI	20.92		3825.00	4069.00	
HEAD HIC	14.76		3846.00	3918.00	
SHD REFL LF	36.01	10.15	3910.00	3853.00	14
SHD REEL LF	20.49	1.24	4095.00	3888.00	16
LF SHOULDER	47.93	14.20	3917.00	3859.00	
SHD REFL RT	44.48	14.92	3897.00	3852.00	15
SHD REEL RT	41.54	4.82	3911.00	3878.00	17
RT SHOULDER	78.55	22.23	3907.00	3854.00	
TOTAL SHLD REFL	78.13	25.28	3897.00	3852.00	
TOTAL SHLD REEL	53.54	8.12	3916.00	3877.00	
TOTAL SHOULDER	122.97	37.43	3909.00	3858.00	
TOTAL SHD / WT	0.72	0.22	3909.00	3858.00	
LF LAP BELT	54.58	7.45	3955.00	3861.00	8
RT LAP BELT	53.98	11.94	3950.00	3860.00	9
TOTAL LAP	106.80	19.46	3954.00	3861.00	
TOTAL LAP / WT	0.63	0.11	3954.00	3861.00	
CROTCH SNAP	89.50	-4.36	4090.00	3867.00	10
LF SEAT LNK X	27.19	-201.90	4152.00	3867.00	18
RT SEAT LNK X	19.30	-144.43	3822.00	3865.00	19
TOTAL SEAT X	16.65	-345.75	3758.00	3866.00	
SEAT LNK Y	57.31	-33.49	3933.00	3864.00	35
LF SEAT PAN Z	352.98	22.21	3867.00	3601.00	11
RT SEAT PAN Z	408.61	25.01	3873.00	3614.00	12
CT SEAT PAN Z	889.42	52.91	3868.00	3602.00	13
TOTAL SEAT Z	1630.50	111.27	3867.00	3604.00	
TOTAL SEAT Z / WT	9.59	0.65	3867.00	3604.00	
RES SEAT FORCE	1666.61	111.33	3867.00	3604.00	
RES SEAT FORCE / WT	9.80	0.65	3867.00	3604.00	
LF FOOT X	-95.53	-187.43	3821.00	3869.00	20
RT FOOT X	-4.04	-197.01	3821.00	3880.00	23
CT FOOT X	-9.86	-199.47	3822.00	3880.00	26
TOTAL FOOT X	-58.37	-578.49	3821.00	3880.00	
LF FOOT Y	168.72	-25.19	3853.00	3727.00	21
RT FOOT Y	15.00	-190.00	3924.00	3881.00	24
CT FOOT Y	35.85	-30.90	3677.00	3875.00	27
TOTAL FOOT Y	58.68	-87.65	3840.00	3882.00	
LF FOOT Z	279.62	44.81	3854.00	3829.00	22
RT FOOT Z	277.58	28.33	3871.00	3823.00	25
CT FOOT Z	117.55	-140.93	3874.00	3834.00	28
TOTAL FOOT Z	597.23	-22.27	3871.00	3811.00	
RES FOOT FORCE	800.50	131.99	3871.00	3822.00	

HEAD REST POS STUDY TEST: 359 SUBJ: R-2 WT: 148.0 G: 10 GP: 1 CELL: A

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.06	9.97	103.00	1904.00	48
CARRIAGE X	1.56	-0.94	3887.00	3893.00	36
CARRIAGE Y	0.44	-1.04	3888.00	3829.00	31
CARRIAGE Z	11.84	-0.27	3879.00	3794.00	1
CARRIAGE Z (SM)	10.55	-0.09	3894.00	3791.00	
CARRIAGE VEL	-1.10	-25.72	4198.00	3836.00	29
SEAT X	2.12	-1.57	3847.00	3892.00	32
SEAT Y	1.00	-0.80	3846.00	4056.00	33
SEAT Z	11.68	-0.29	3885.00	3716.00	34
SEAT Z (SM)	10.77	-0.16	3886.00	3716.00	
CHEST X	4.21	-0.46	3900.00	3774.00	5
CHEST Y	-0.60	-1.54	4059.00	3849.00	6
CHEST Z	11.41	-1.86	3888.00	3719.00	7
CHEST RES	11.98	0.79	3904.00	4111.00	
CHEST SI	17.12		3849.00	3955.00	
HEAD X	.14	-5.59	3775.00	3925.00	2
HEAD Y	1.27	-0.12	3846.00	3924.00	3
HEAD Z	12.79	-1.15	3894.00	3769.00	4
HEAD RES	13.09	0.99	3894.00	3842.00	
HEAD SI	17.54		3851.00	4008.00	
HEAD HIC	13.42		3871.00	3943.00	
SHD REFL LF	55.57	23.37	3922.00	3980.00	14
SHD REEL LF	62.82	17.59	3959.00	3894.00	16
LF SHOULDER	107.52	50.26	3924.00	3893.00	
SHD REFL RT	58.74	32.06	3924.00	4100.00	15
SHD REEL RT	47.65	19.08	3924.00	3897.00	17
RT SHOULDER	106.39	54.72	3924.00	4036.00	
TOTAL SHLD REFL	114.09	60.73	3923.00	3985.00	
TOTAL SHLD REEL	106.49	38.13	3961.00	3895.00	
TOTAL SHOULDER	213.91	110.61	3924.00	3887.00	
TOTAL SHD / WT	1.45	0.75	3924.00	3887.00	
LF LAP BELT	64.49	31.96	3991.00	3892.00	8
RT LAP BELT	41.77	21.11	4001.00	3901.00	9
TOTAL LAP	104.42	54.21	3979.00	3901.00	
TOTAL LAP / WT	0.71	0.37	3979.00	3901.00	
CROTCH STRAP	138.89	32.71	3970.00	3893.00	10
LF SEAT LNK X	66.38	-140.26	4097.00	3893.00	18
RT SEAT LNK X	73.58	-44.56	3932.00	3893.00	19
TOTAL SEAT X	103.55	-184.82	4095.00	3893.00	
SEAT LNK Y	72.77	-20.45	3945.00	3889.00	35
LF SEAT PAN Z	331.43	12.08	3099.00	3619.00	11
RT SEAT PAN Z	292.45	10.11	3895.00	3600.00	12
CT SEAT PAN Z	984.42	116.79	3903.00	3611.00	13
TOTAL SEAT Z	1586.30	153.01	3895.00	3619.00	
TOTAL SEAT Z / WT	10.79	1.03	3895.00	3619.00	
RES SEAT FORCE	1605.33	160.34	3895.00	3619.00	
RES SEAT FORCE / WT	10.85	1.08	3895.00	3619.00	
LF FOOT X	22.51	-151.98	3848.00	3898.00	20
RT FOOT X	16.32	-135.24	3846.00	3898.00	23
CT FOOT X	33.56	-156.95	3847.00	3898.00	26
TOTAL FOOT X	71.49	-444.18	3847.00	3898.00	
LF FOOT Y	141.50	-17.47	3881.00	4076.00	21
RT FOOT Y	17.11	-132.87	4189.00	3899.00	24
CT FOOT Y	19.97	-53.90	3862.00	3898.00	27
TOTAL FOOT Y	54.81	-86.23	3866.00	3898.00	
LF FOOT Z	167.52	-19.40	3882.00	3050.00	22
RT FOOT Z	192.93	-15.18	3907.00	3995.00	25
CT FOOT Z	178.57	-88.24	3884.00	3858.00	28
TOTAL FOOT Z	464.41	-54.41	3883.00	3829.00	
RES FOOT FORCE	568.80	15.46	3907.00	3986.00	

HEAD REST POS STUDY TEST: 404 SUBJ: A-1 WT: 197.0 G: 10 GP: 2 CELL: A

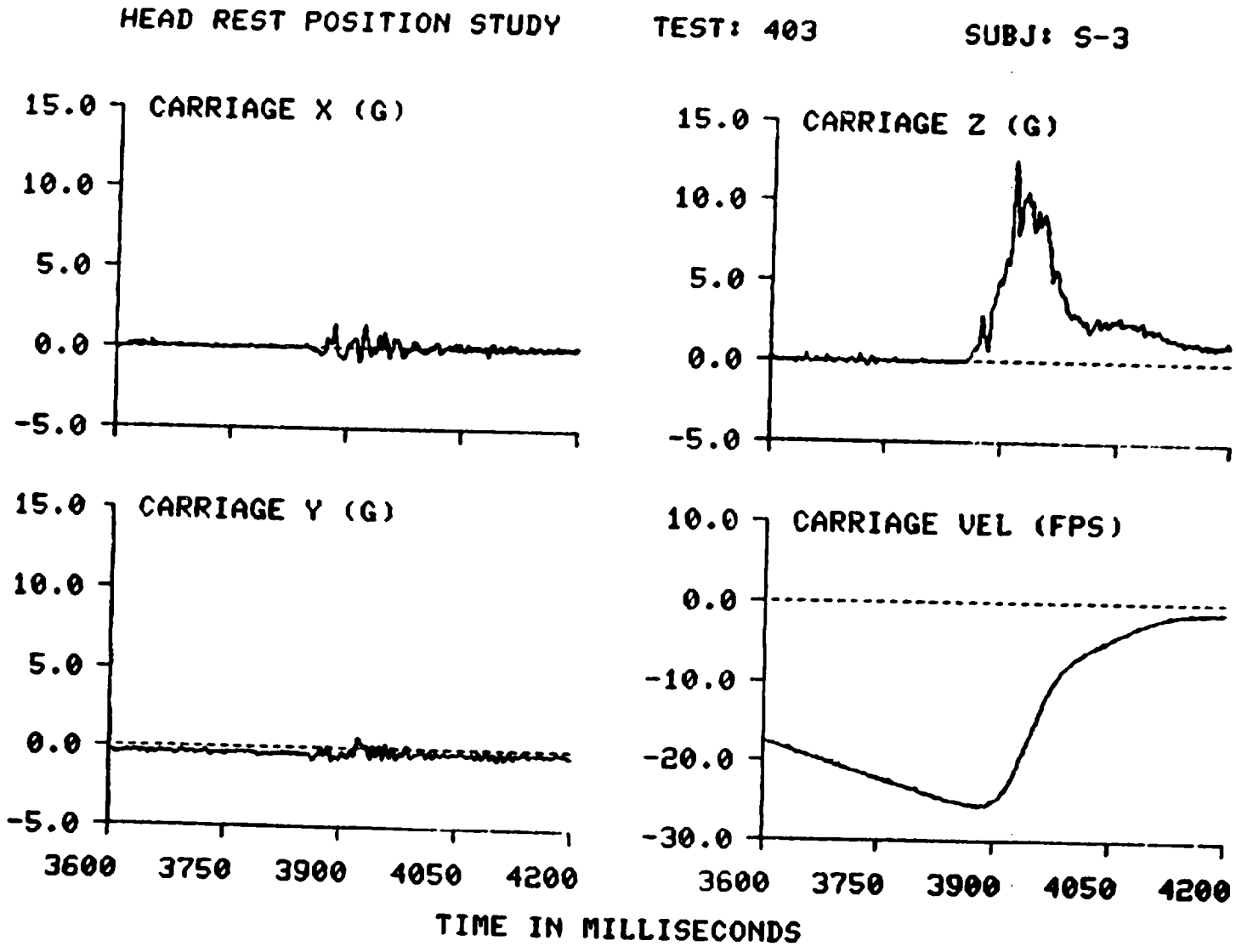
DATA ID	MAX	MIN	T1	T2	CM
10V EXT PWR	10.05	9.96	3421.00	2565.00	48
CARRIAGE X	1.69	-1.03	3887.00	3901.00	36
CARRIAGE Y	0.40	-1.10	3998.00	3872.00	31
CARRIAGE Z	11.84	-0.29	3919.00	3824.00	1
CARRIAGE Z (SM)	10.50	-0.10	3933.00	3823.00	
CARRIAGE VEL	-1.12	-25.83	4178.00	3879.00	29
SEAT X	1.54	-1.34	3884.00	3933.00	32
SEAT Y	1.24	-1.45	3868.00	3895.00	33
SEAT Z	11.44	-0.19	3926.00	3728.00	34
SEAT Z (SM)	10.38	-0.16	3926.00	3728.00	
CHEST X	7.25	-0.45	3949.00	3643.00	5
CHEST Y	-0.44	-2.68	3902.00	3951.00	6
CHEST Z	15.30	-0.99	3959.00	3826.00	7
CHEST RES	16.94	0.84	3951.00	3880.00	
CHEST SI	29.17		3885.00	4012.00	
HEAD X	1.75	-5.36	3928.00	3980.00	2
HEAD Y	1.18	-1.44	4000.00	3939.00	3
HEAD Z	12.94	-0.95	3941.00	3847.00	4
HEAD RES	12.45	0.21	3941.00	4152.00	
HEAD SI	19.35		3893.00	4116.00	
HEAD HIC	14.98		3914.00	4004.00	
SHD REFL LF	69.17	28.92	3975.00	3925.00	14
SHD REEL LF	75.83	12.19	4010.00	3931.00	16
LF SHOULDER	198.91	42.51	3975.00	3925.00	
SHD REFL RT	76.89	33.95	4098.00	3922.00	15
SHD REEL RT	89.70	2.62	4000.00	3933.00	17
RT SHOULDER	197.56	38.07	4000.00	3930.00	
TOTAL SHLD REFL	126.82	63.70	3974.00	3925.00	
TOTAL SHLD REEL	153.36	15.00	4004.00	3932.00	
TOTAL SHOULDER	269.52	82.46	3973.00	3932.00	
TOTAL SHD / WT	1.37	0.42	3973.00	3932.00	
LF LAP BELT	53.48	33.52	4078.00	3926.00	8
RT LAP BELT	84.79	39.56	4078.00	3920.00	9
TOTAL LAP	118.27	74.50	4078.00	3919.00	
TOTAL LAP / WT	0.60	0.38	4078.00	3919.00	
CROTCH STRAP	260.97	-72.56	4029.00	3942.00	10
LF SEAT LNK X	90.84	-191.91	4039.00	3835.00	18
RT SEAT LNK X	-4.54	-165.98	3770.00	3940.00	19
TOTAL SEAT X	8.71	-354.98	4191.00	3941.00	
SEAT LNK Y	57.04	-67.04	4020.00	3840.00	35
LF SEAT PAN Z	464.47	44.61	3941.00	3629.00	11
RT SEAT PAN Z	665.77	50.05	3941.00	3602.00	12
CT SEAT PAN Z	794.79	57.89	3943.00	3604.00	13
TOTAL SEAT Z	1918.39	164.42	3942.00	3602.00	
TOTAL SEAT Z / WT	9.74	0.83	3942.00	3602.00	
RES SEAT FORCE	1951.14	164.64	3942.00	3602.00	
RES SEAT FORCE / WT	9.90	0.84	3942.00	3602.00	
LF FOOT X	-23.80	-225.42	3681.00	3938.00	20
RT FOOT X	-17.73	-189.56	3889.00	3937.00	23
CT FOOT X	-43.16	-269.45	3889.00	3935.00	26
TOTAL FOOT X	-89.21	-680.89	3889.00	3936.00	
LF FOOT Y	197.32	-24.54	3921.00	4128.00	21
RT FOOT Y	30.88	-175.00	3824.00	3938.00	24
CT FOOT Y	26.66	-55.91	4042.00	3932.00	27
TOTAL FOOT Y	60.29	-65.62	3962.00	3950.00	
LF FOOT Z	296.66	28.63	3922.00	3880.00	22
RT FOOT Z	275.38	36.83	3937.00	3618.00	25
CT FOOT Z	122.16	-151.03	3943.00	3901.00	28
TOTAL FOOT Z	633.92	-40.65	3922.00	3880.00	
RES FOOT FORCE	868.36	168.54	3938.00	3816.00	

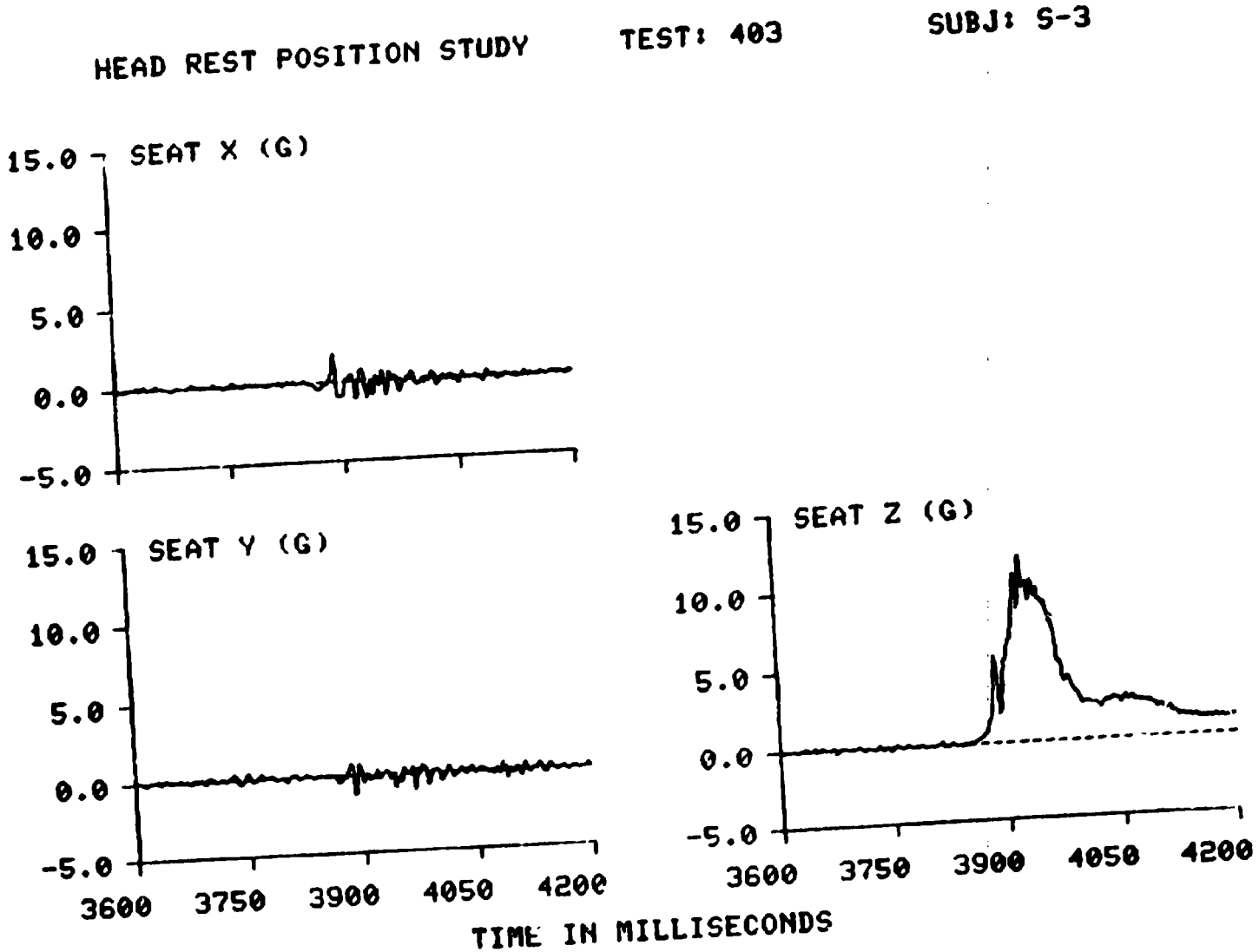
HEAD REST POS STUDY TEST: 385 SUBJ: A-3 WT: 146.0 G: 10 GP: 2 CELL: A

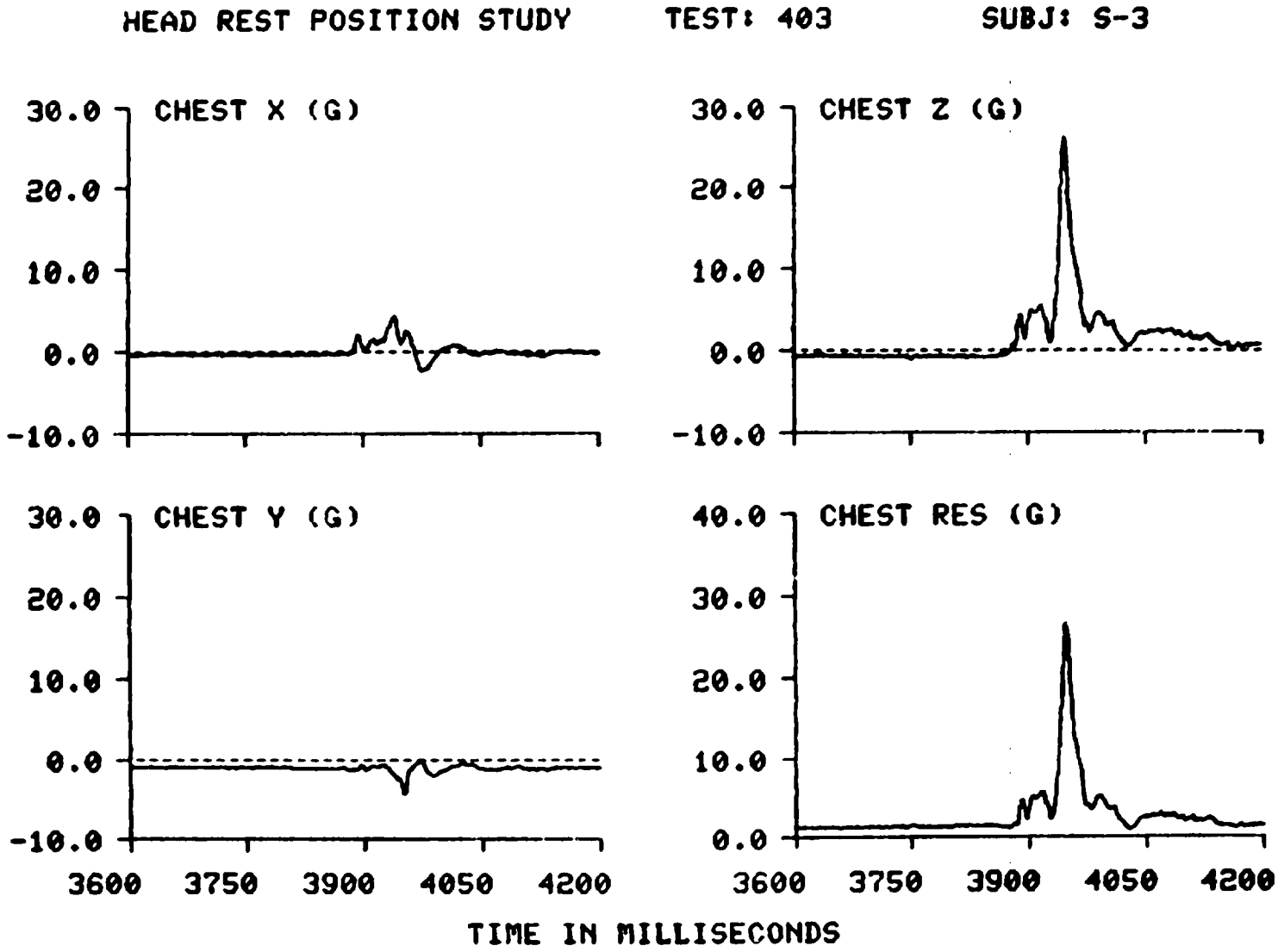
DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.04	9.96	12.00	788.00	48
CARRIAGE X	1.57	-1.18	3925.00	3935.00	36
CARRIAGE Y	1.00	-0.65	3924.00	4080.00	91
CARRIAGE Z	12.88	-0.26	3919.00	3751.00	1
CARRIAGE Z (SM)	10.69	-0.14	3935.00	3751.00	
CARRIAGE VEL	-1.08	-25.47	4189.00	3889.00	29
SEAT X	1.36	-1.61	3886.00	3934.00	92
SEAT Y	0.47	-0.99	3884.00	3890.00	33
SEAT Z	12.27	-0.16	3925.00	3734.00	34
SEAT Z (SM)	10.78	-0.10	3926.00	3612.00	
CHEST X	3.11	-0.80	3952.00	3974.00	5
CHEST Y	0.02	-2.00	3926.00	3938.00	6
CHEST Z	14.76	-0.99	3950.00	3763.00	7
CHEST RES	15.12	0.99	3952.00	4185.00	
CHEST SI	22.32		3887.00	4009.00	
HEAD X	.31	-5.46	3724.00	3965.00	2
HEAD Y	3.91	-0.96	4042.00	3954.00	3
HEAD Z	11.78	-1.51	3936.00	4042.00	4
HEAD RES	11.90	0.62	3936.00	4160.00	
HEAD SI	18.45		3891.00	4034.00	
HEAD HIC	14.99		3910.00	3992.00	
SHD REFL LF	55.96	26.78	3968.00	4087.00	14
SHD REEL LF	93.89	9.18	4080.00	3933.00	16
LF SHOULDER	85.92	48.85	3968.00	3922.00	
SHD REFL RT	57.27	30.52	3953.00	4038.00	15
SHD REEL RT	61.34	13.22	3991.00	3930.00	17
RT SHOULDER	111.90	59.75	3961.00	3921.00	
TOTAL SHLD REFL	108.18	64.93	3957.00	4036.00	
TOTAL SHLD REEL	89.03	23.19	3963.00	3931.00	
TOTAL SHOULDER	193.88	109.17	3961.00	3922.00	
TOTAL SHD / WT	1.33	0.75	3961.00	3922.00	
LF LAP BELT	50.95	11.74	4011.00	3944.00	8
RT LAP BELT	53.76	18.54	4007.00	3945.00	9
TOTAL LAP	104.28	30.48	4010.00	3944.00	
TOTAL LAP / WT	0.71	0.21	4010.00	3944.00	
CROTCH STRAP	60.74	-43.70	4020.00	3932.00	10
LF SEAT LNK X	60.87	-144.61	4014.00	3934.00	18
RT SEAT LNK X	43.26	-46.43	3983.00	3934.00	19
TOTAL SEAT X	81.19	-191.04	4012.00	3934.00	
SEAT LNK Y	75.57	-58.21	4001.00	3933.00	35
LF SEAT PAN Z	417.16	53.05	3936.00	3617.00	11
RT SEAT PAN Z	334.67	44.17	3935.00	3609.00	12
CT SEAT PAN Z	787.84	91.92	3943.00	3623.00	13
TOTAL SEAT Z	1553.97	198.71	3936.00	3617.00	
TOTAL SEAT Z / WT	10.64	1.36	3936.00	3617.00	
RES SEAT FORCE	1565.65	202.42	3936.00	3617.00	
RES SEAT FORCE / WT	10.72	1.39	3936.00	3617.00	
LF FOOT X	2.21	-136.13	3884.00	3934.00	20
RT FOOT X	10.56	-90.78	3926.00	3934.00	23
CT FOOT X	13.40	-139.55	3883.00	3995.00	26
TOTAL FOOT X	15.54	-381.98	3885.00	3934.00	
LF FOOT Y	148.18	-21.28	3921.00	4072.00	21
RT FOOT Y	27.28	-124.49	4075.00	3929.00	24
CT FOOT Y	18.95	-50.35	3897.00	3931.00	27
TOTAL FOOT Y	41.11	-61.08	3897.00	3940.00	
LF FOOT Z	187.97	-16.48	3921.00	3875.00	22
RT FOOT Z	194.09	-7.03	3922.00	3895.00	25
CT FOOT Z	151.82	-63.08	3928.00	3895.00	28
TOTAL FOOT Z	456.59	-59.63	3922.00	3895.00	
RES FOOT FORCE	516.44	16.66	3945.00	3733.00	

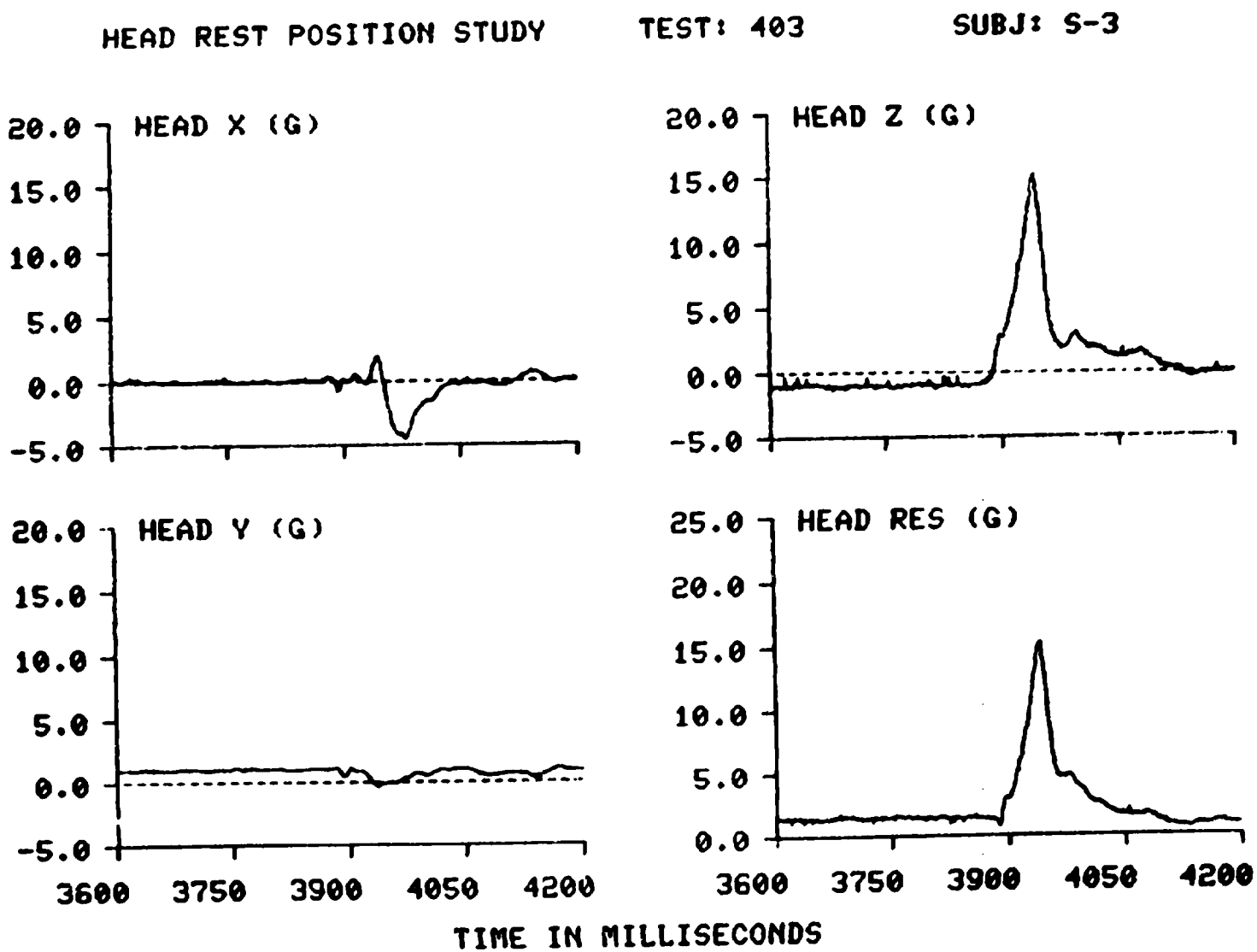
HEAD REST POS STUDY TEST: 403 SUBJ: S-3 WT: 165.0 G: 10 GP: 2 CELL: A

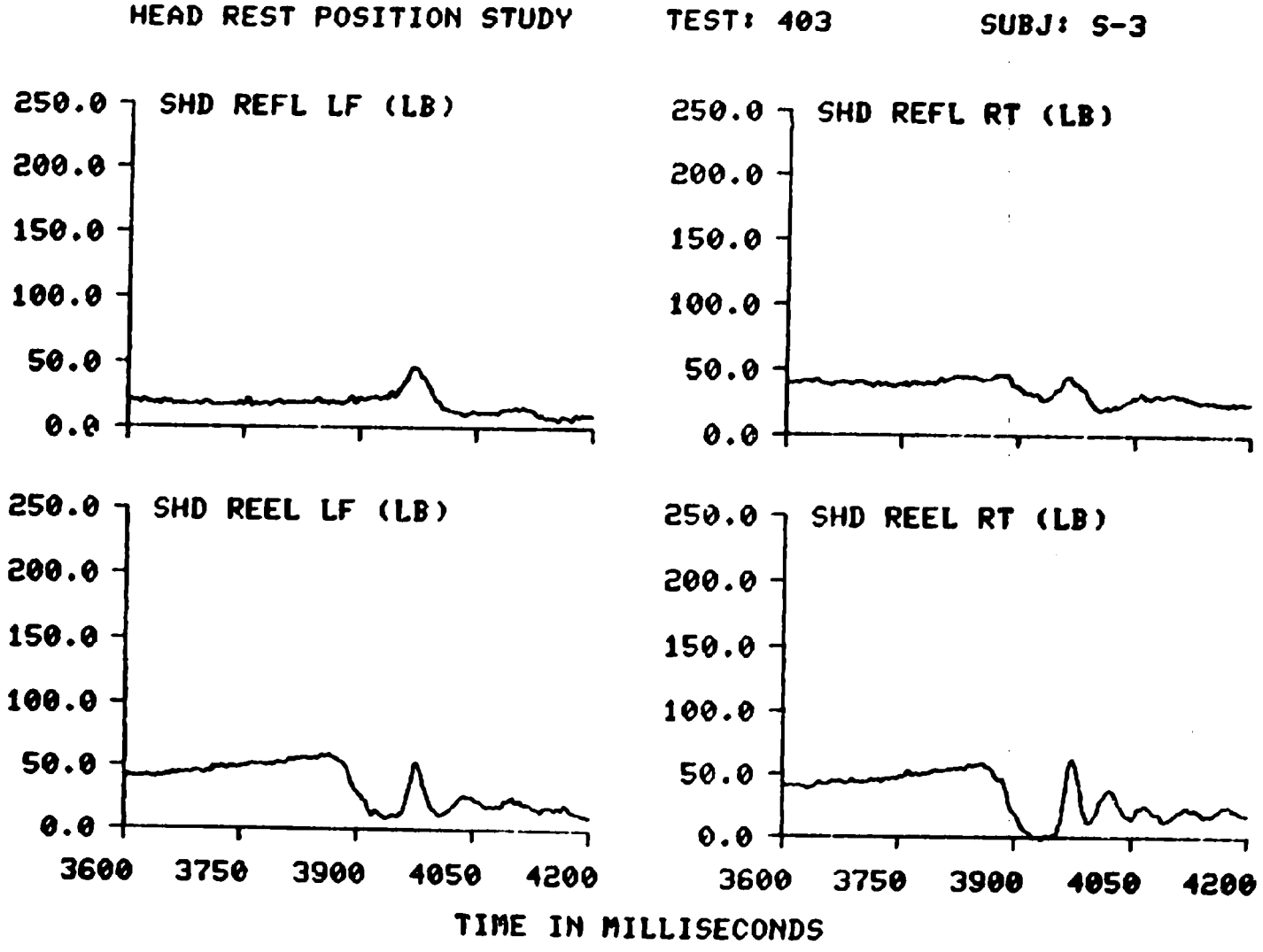
DATA ID	MAX	MIN	T1	T2	CM
10V EXT PWR	10.05	9.96	2566.00	1603.00	48
CARRIAGE X	1.48	-0.83	3923.00	3917.00	36
CARRIAGE Y	0.66	-0.86	3924.00	3890.00	31
CARRIAGE Z	12.61	-0.32	3917.00	3727.00	1
CARRIAGE Z (SM)	10.59	-0.16	3917.00	3726.00	
CARRIAGE VEL	-1.26	-25.78	4198.00	3883.00	29
SEAT X	1.69	-1.10	3887.00	3916.00	32
SEAT Y	0.78	-1.27	3896.00	3890.00	33
SEAT Z	11.75	-0.28	3924.00	3748.00	34
SEAT Z (SM)	10.66	-0.14	3924.00	3747.00	
CHEST X	4.32	-2.29	3940.00	3975.00	5
CHEST Y	-0.08	-4.33	3973.00	3951.00	6
CHEST Z	26.23	-1.11	3947.00	3752.00	7
CHEST RES	26.41	0.80	3947.00	4031.00	
CHEST SI	43.49		3885.00	4022.00	
HEAD X	1.92	-4.47	3943.00	3978.00	2
HEAD Y	1.17	-0.41	3885.00	3936.00	3
HEAD Z	15.20	-1.30	3942.00	3682.00	4
HEAD RES	15.32	0.57	3942.00	4135.00	
HEAD SI	20.96		3893.00	4035.00	
HEAD HIC	15.83		3916.00	3959.00	
SHD REFL LF	46.52	10.09	3968.00	4035.00	14
SHD REEL LF	52.73	8.73	3977.00	3937.00	16
LF SHOULDER	96.23	25.95	3976.00	4008.00	
SHD REFL RT	45.15	19.27	3965.00	4007.00	15
SHD REEL RT	61.46	-2.14	3974.00	3935.00	17
RT SHOULDER	101.87	25.89	3974.00	3935.00	
TOTAL SHLD REFL	90.90	33.14	3967.00	4017.00	
TOTAL SHLD REEL	111.94	6.95	3975.00	3936.00	
TOTAL SHOULDER	197.26	58.75	3975.00	3935.00	
TOTAL SHD / WT	1.20	0.36	3975.00	3935.00	
LF LAP BELT	41.61	12.85	4005.00	3917.00	8
RT LAP BELT	43.27	15.93	3988.00	3927.00	9
TOTAL LAP	84.24	29.55	3979.00	3918.00	
TOTAL LAP / WT	0.51	0.18	3979.00	3918.00	
CROTCH STRAP	49.08	-42.66	4036.00	3933.00	10
LF SEAT LNK X	35.23	-206.52	3637.00	3937.00	18
RT SEAT LNK X	13.48	-124.48	3889.00	3936.00	19
TOTAL SEAT X	28.27	-329.23	3637.00	3932.00	
SEAT LNK Y	54.92	-106.69	4032.00	3940.00	35
LF SEAT PAN Z	548.80	53.37	3942.00	3602.00	11
RT SEAT PAN Z	454.73	41.92	3933.00	3619.00	12
CT SEAT PAN Z	789.50	37.71	3941.00	3609.00	13
TOTAL SEAT Z	1751.68	146.77	3941.00	3619.00	
TOTAL SEAT Z / WT	10.62	0.89	3941.00	3619.00	
RES SEAT FORCE	1782.79	149.59	3941.00	3619.00	
RES SEAT FORCE / WT	10.80	0.91	3941.00	3619.00	
LF FOOT X	5.35	-121.23	3884.00	3945.00	20
RT FOOT X	13.20	-85.49	3882.00	3935.00	23
CT FOOT X	23.00	-155.72	3885.00	3938.00	26
TOTAL FOOT X	39.78	-362.52	3884.00	3935.00	
LF FOOT Y	129.55	-20.68	3920.00	4106.00	21
RT FOOT Y	26.30	-115.89	4129.00	3919.00	24
CT FOOT Y	37.16	-40.26	3957.00	3925.00	27
TOTAL FOOT Y	40.33	-49.90	3958.00	3928.00	
LF FOOT Z	165.42	-13.63	3943.00	3876.00	22
RT FOOT Z	177.63	-10.04	3920.00	3733.00	25
CT FOOT Z	220.86	-68.95	3927.00	3893.00	28
TOTAL FOOT Z	514.60	-42.01	3921.00	3875.00	
RES FOOT FORCE	558.65	27.10	3943.00	4018.00	

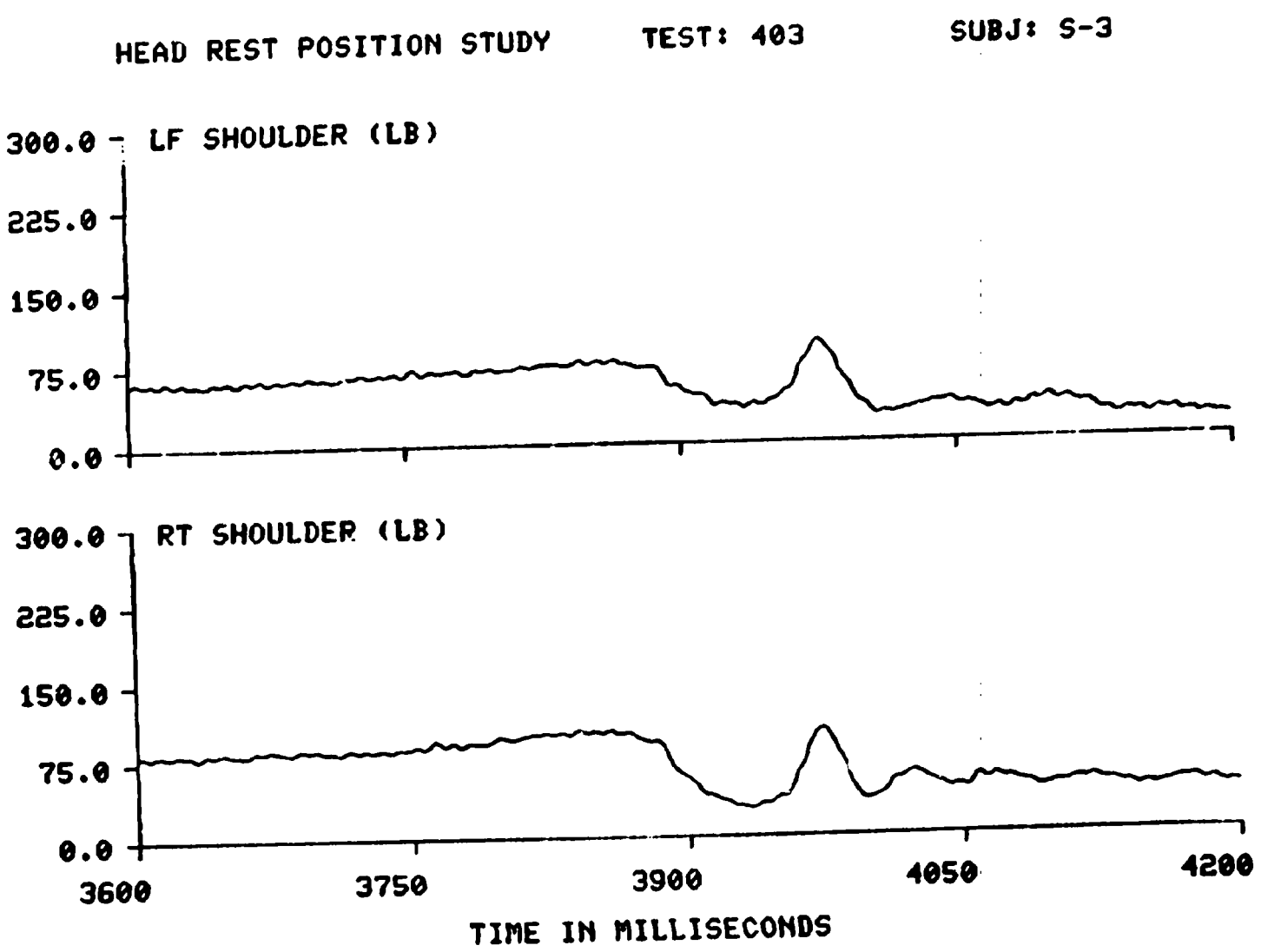

HEAD REST POSITION STUDY
TEST: 403
SUBJ: S-3
CARRIAGE X (G)
15.0
10.0
5.0
0.0
-5.0
CARRIAGE Z (G)
15.0
10.0
5.0
0.0
-5.0
CARRIAGE Y (G)
15.0
10.0
5.0
0.0
-5.0
CARRIAGE VEL (FPS)
10.0
0.0
-10.0
-20.0
-30.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

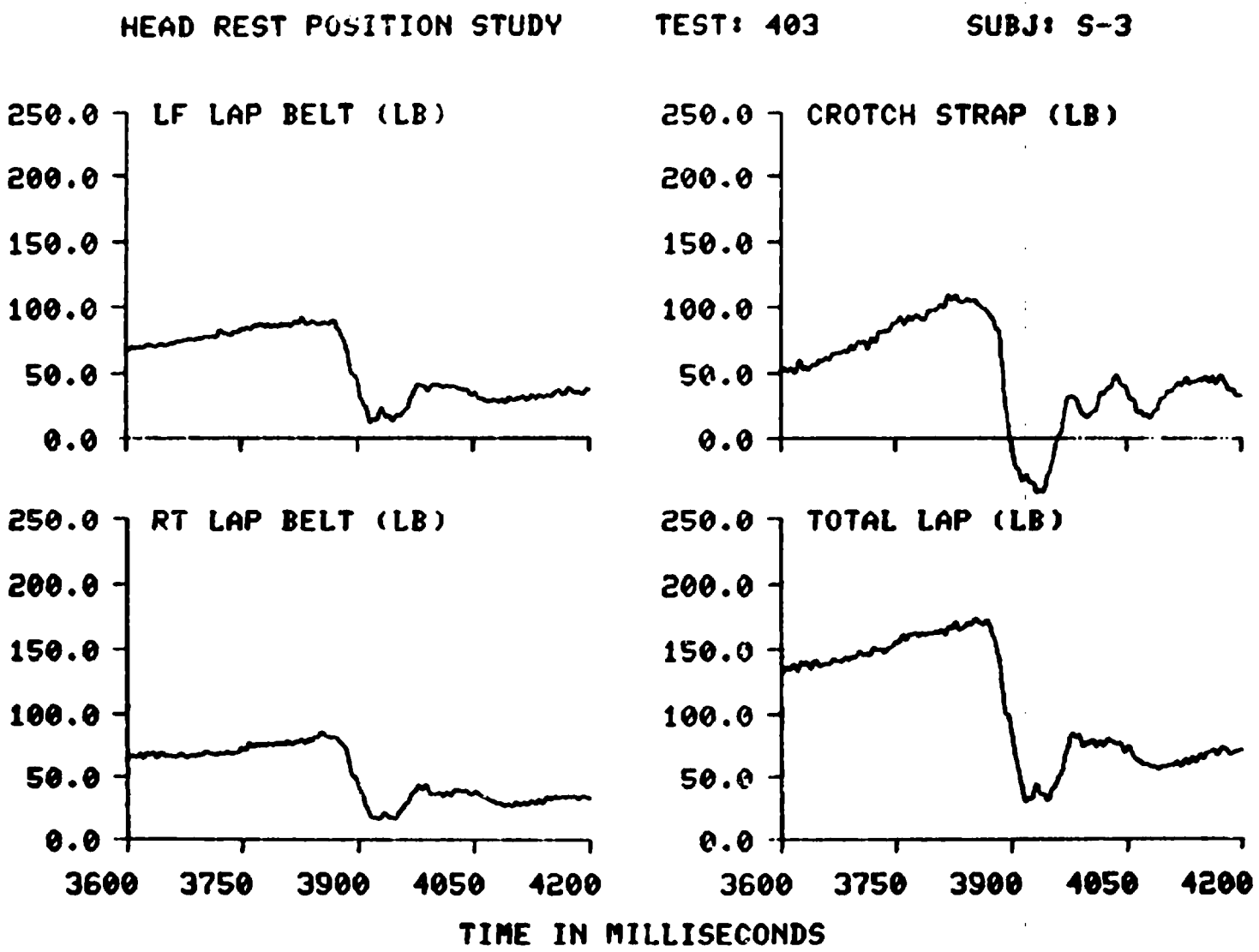

HEAD REST POSITION STUDY
TEST: 403
SUBJ: S-3
SEAT X (G)
15.0
10.0
5.0
0.0
-5.0
SEAT Y (G)
15.0
10.0
5.0
0.0
-5.0
SEAT Z (G)
15.0
10.0
5.0
0.0
-5.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

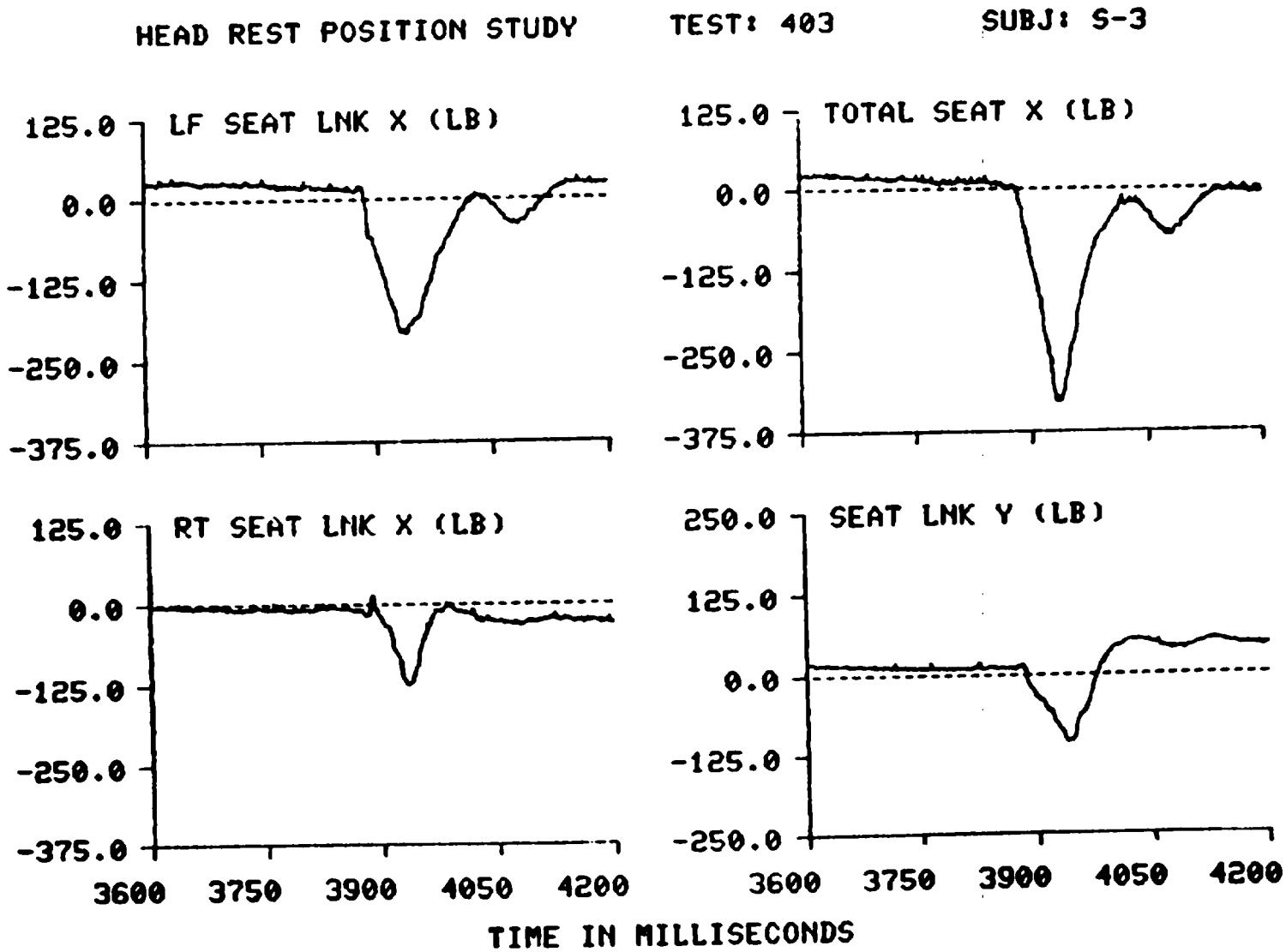

HEAD REST POSITION STUDY
TEST: 403
SUBJ: S-3
CHEST X (G)
CHEST Z (G)
CHEST Y (G)
CHEST RES (G)
30.0
20.0
10.0
0.0
-10.0
40.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

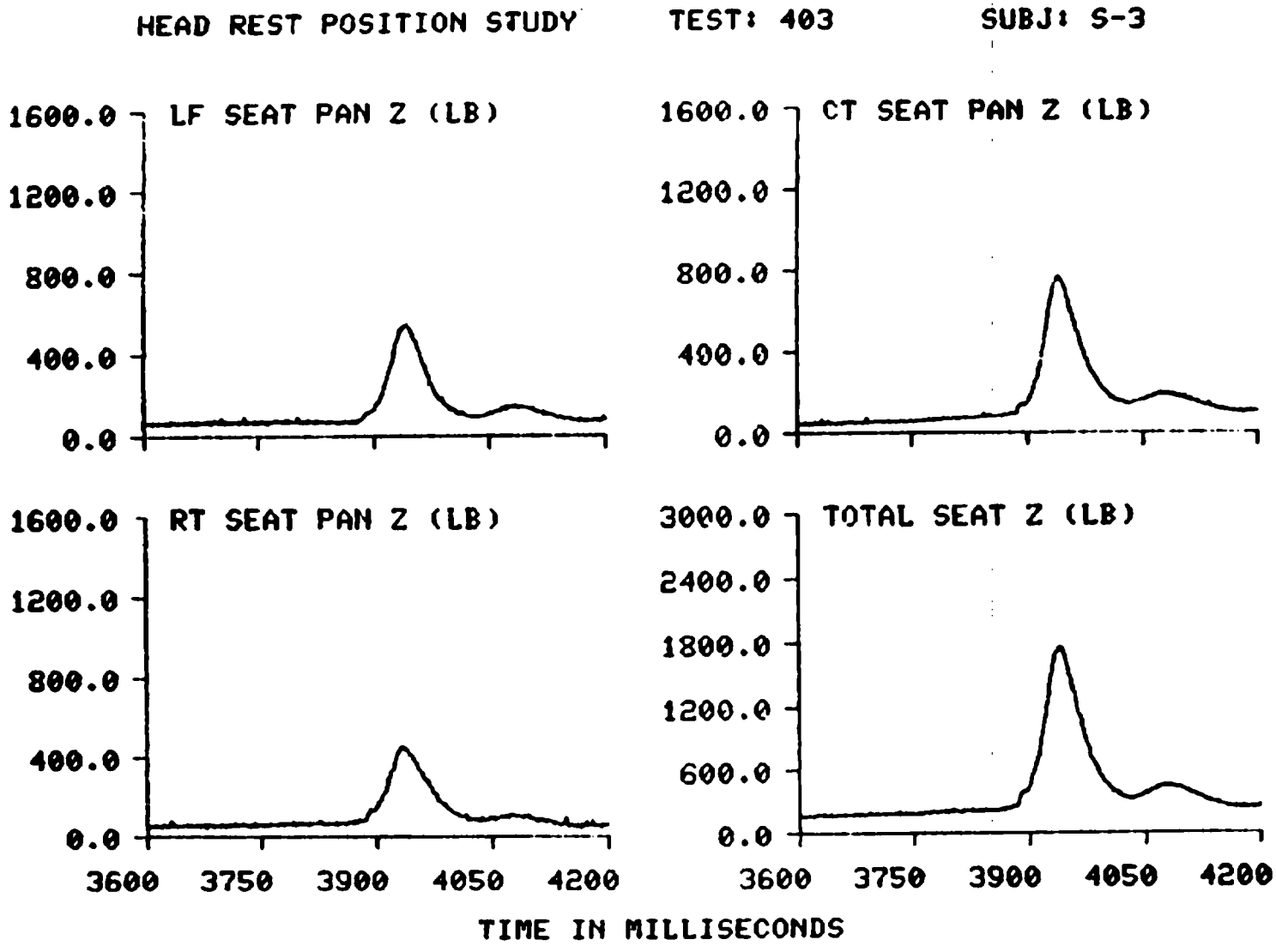

HEAD REST POSITION STUDY
TEST: 403
SUBJ: S-3
HEAD X (G)
HEAD Z (G)
HEAD Y (G)
HEAD RES (G)
20.0
15.0
10.0
5.0
0.0
-5.0
25.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

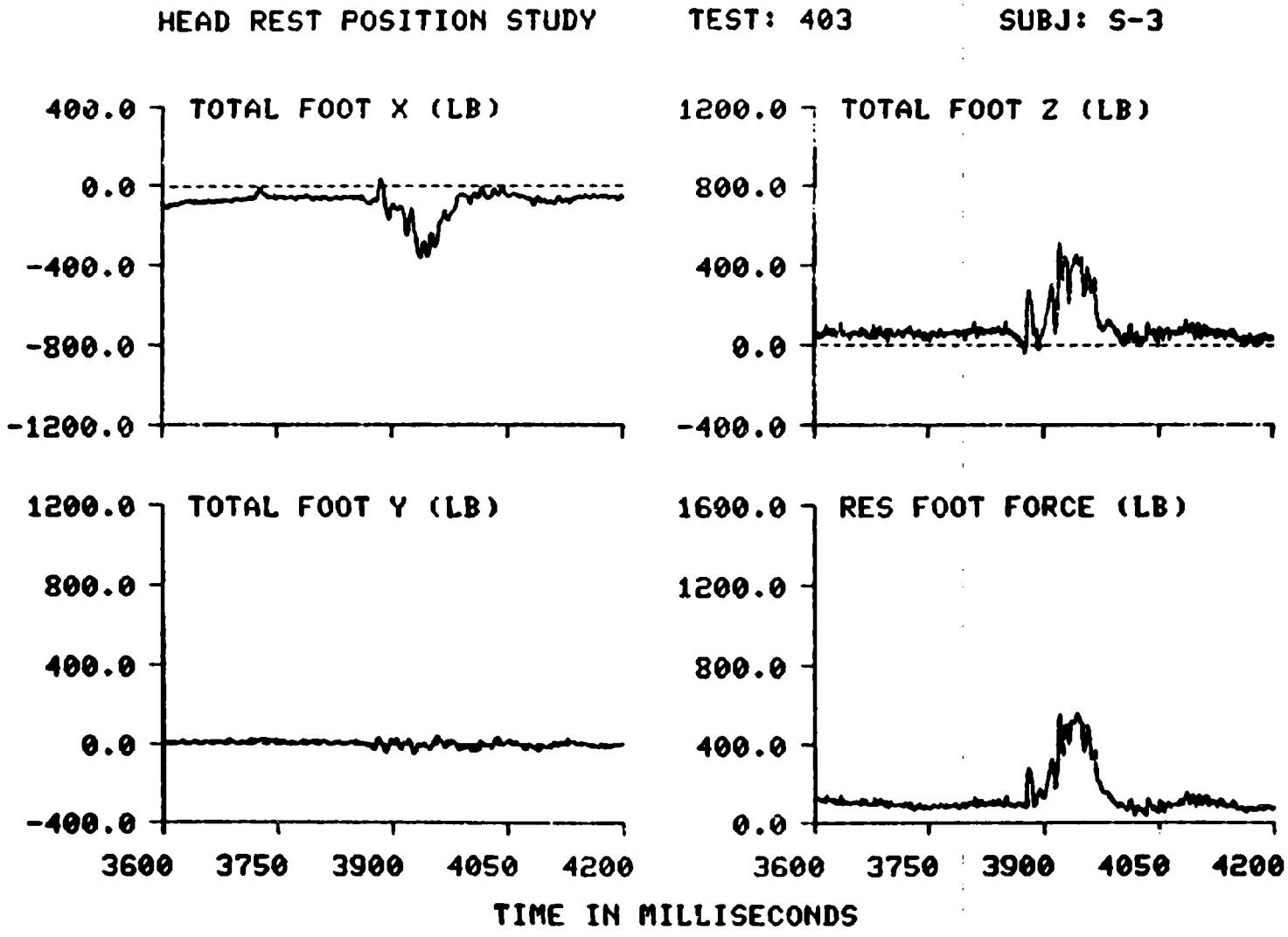

HEAD REST POSITION STUDY
TEST: 403
SUBJ: S-3
SHD REFL LF (LB)
SHD REFL RT (LB)
SHD REEL LF (LB)
SHD REEL RT (LB)
250.0
200.0
150.0
100.0
50.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 403
SUBJ: S-3
300.0
LF SHOULDER (LB)
225.0
150.0
75.0
0.0
300.0
RT SHOULDER (LB)
225.0
150.0
75.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 403
SUBJ: S-3
LF LAP BELT (LB)
CROTCH STRAP (LB)
RT LAP BELT (LB)
TOTAL LAP (LB)
250.0
200.0
150.0
100.0
50.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 403
SUBJ: S-3
LF SEAT LNK X (LB)
TOTAL SEAT X (LB)
RT SEAT LNK X (LB)
SEAT LNK Y (LB)
125.0
0.0
-125.0
-250.0
-375.0
250.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 403
SUBJ: S-3
LF SEAT PAN Z (LB)
CT SEAT PAN Z (LB)
RT SEAT PAN Z (LB)
TOTAL SEAT Z (LB)
1600.0
1200.0
800.0
400.0
0.0
3000.0
2400.0
1800.0
600.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 403
SUBJ: S-3
TOTAL FOOT X (LB)
400.0
0.0
-400.0
-800.0
-1200.0
TOTAL FOOT Z (LB)
1200.0
800.0
400.0
0.0
-400.0
TOTAL FOOT Y (LB)
1200.0
800.0
400.0
0.0
-400.0
RES FOOT FORCE (LB)
1600.0
1200.0
800.0
400.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

HEAD REST POS STUDY TEST: 345 SUBJ: 0-1 WT: 205.0 G: 10 GP: 1 CELL: B

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	3367.00	377.00	48
CARRIAGE X	1.48	-0.99	3840.00	3833.00	36
CARRIAGE Y	0.54	-0.87	3841.00	3981.00	31
CARRIAGE Z	12.45	-0.21	3833.00	3613.00	1
CARRIAGE Z (SM)	10.61	-0.10	3834.00	3612.00	
CARRIAGE VEL	-1.08	-25.73	4161.00	3795.00	29
SEAT X	1.24	-1.07	3841.00	3833.00	32
SEAT Y	0.89	-1.52	3812.00	3806.00	33
SEAT Z	11.48	-0.21	3840.00	3660.00	34
SEAT Z (SM)	10.62	-0.14	3841.00	3660.00	
CHEST X	5.45	-0.96	3852.00	3882.00	5
CHEST Y	-0.24	-3.93	3929.00	3864.00	6
CHEST Z	15.08	-0.79	3871.00	3672.00	7
CHEST RES	15.19	0.67	3871.00	3694.00	
CHEST SI	27.94		3797.00	3931.00	
HEAD X	1.56	-1.29	3841.00	3879.00	2
HEAD Y	0.82	-1.31	3902.00	3849.00	3
HEAD Z	19.05	-0.83	3853.00	3673.00	4
HEAD RES	13.18	0.44	3853.00	3798.00	
HEAD SI	18.22		3805.00	3914.00	
HEAD HIC	16.22		3827.00	3891.00	
SHD REFL LF	50.22	10.41	3863.00	4093.00	14
SHD REEL LF	90.38	2.33	3942.00	3838.00	16
LF SHOULDER	86.21	21.45	3884.00	4094.00	
SHD REFL RT	59.58	18.66	3875.00	4100.00	15
SHD REEL RT	43.93	5.14	3929.00	3847.00	17
RT SHOULDER	96.92	32.58	3879.00	3838.00	
TOTAL SHLD REFL	108.23	29.57	3871.00	4093.00	
TOTAL SHLD REEL	69.16	8.39	3939.00	3839.00	
TOTAL SHOULDER	161.97	60.92	3881.00	3837.00	
TOTAL SHD / WT	0.79	0.30	3881.00	3837.00	
LF LAP BELT	59.40	29.41	3939.00	3836.00	8
RT LAP BELT	45.67	20.85	3943.00	3843.00	9
TOTAL LAP	104.85	51.63	3943.00	3843.00	
TOTAL LAP / WT	0.51	0.25	3943.00	3843.00	
CROTCH STRAP	249.79	-22.05	3946.00	3849.00	10
LF SEAT LNK X	69.11	-109.33	3920.00	3847.00	18
RT SEAT LNK X	49.26	-49.71	3906.00	3846.00	19
TOTAL SEAT X	105.76	-157.80	3914.00	3847.00	
SEAT LNK Y	52.20	-39.20	3904.00	3856.00	35
LF SEAT PAN Z	479.12	34.85	3849.00	3603.00	11
RT SEAT PAN Z	402.81	38.43	3855.00	3688.00	12
CT SEAT PAN Z	1131.68	106.95	3852.00	3678.00	13
TOTAL SEAT Z	2006.65	202.21	3852.00	3671.00	
TOTAL SEAT Z / WT	9.79	0.99	3852.00	3671.00	
RES SEAT FORCE	2012.48	207.09	3852.00	3671.00	
RES SEAT FORCE / WT	9.82	1.01	3852.00	3671.00	
LF FOOT X	-95.44	-244.29	4093.00	3850.00	20
RT FOOT X	-29.66	-270.22	4086.00	3850.00	23
CT FOOT X	-90.37	-276.34	4068.00	3852.00	26
TOTAL FOOT X	-105.39	-782.82	4086.00	3851.00	
LF FOOT Y	190.05	-26.57	3935.00	3946.00	21
RT FOOT Y	18.67	-204.07	4059.00	3852.00	24
CT FOOT Y	25.29	-29.88	3822.00	3847.00	27
TOTAL FOOT Y	38.22	-51.57	3884.00	3850.00	
LF FOOT Z	282.25	22.61	3860.00	3789.00	22
RT FOOT Z	314.19	40.41	3860.00	4059.00	25
CT FOOT Z	150.25	-108.06	3844.00	3790.00	28
TOTAL FOOT Z	878.79	-18.99	3844.00	3789.00	
RES FOOT FORCE	986.66	125.09	3852.00	4086.00	

HEAD REST POS STUDY TEST: 389 SUBJ: F-3 WT: 166.0 G: 10 GP: 1 CELL: B

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.06	9.98	1985.00	331.00	48
CARRIAGE X	1.43	-0.95	3898.00	3868.00	36
CARRIAGE Y	0.82	-0.81	3897.00	3840.00	31
CARRIAGE Z	12.39	-0.34	3891.00	3811.00	1
CARRIAGE Z (SM)	10.55	-0.12	3892.00	3692.00	
CARRIAGE VEL	-1.12	-25.58	4191.00	3849.00	29
SEAT X	1.26	-1.21	3859.00	3868.00	32
SEAT Y	1.19	-0.95	3853.00	3916.00	33
SEAT Z	11.62	-0.20	3898.00	3719.00	34
SEAT Z (SM)	10.70	-0.10	3899.00	3717.00	
CHEST X	3.25	-1.93	3898.00	3942.00	5
CHEST Y	0.84	-1.60	3903.00	4014.00	6
CHEST Z	22.33	-1.10	3924.00	3826.00	7
CHEST RES	22.43	0.54	3924.00	3988.00	
CHEST SI	37.08		3853.00	3984.00	
HEAD X	3.10	-0.35	3915.00	3728.00	2
HEAD Y	2.43	-0.56	3985.00	3916.00	3
HEAD Z	12.04	-1.25	3911.00	3696.00	4
HEAD RES	12.38	0.84	3914.00	4082.00	
HEAD SI	19.21		3865.00	4000.00	
HEAD HIC	16.65		3888.00	3953.00	
SHD REFL LF	54.82	19.13	3935.00	4000.00	14
SHD REEL LF	42.49	10.39	3942.00	3912.00	16
LF SHOULDER	95.06	42.89	3941.00	3971.00	
SHD REFL RT	50.16	25.96	3932.00	3959.00	15
SHD REEL RT	61.97	9.23	3985.00	3907.00	17
RT SHOULDER	101.95	44.37	3936.00	3914.00	
TOTAL SHLD REFL	104.38	56.50	3933.00	4001.00	
TOTAL SHLD REEL	99.32	20.00	3941.00	3912.00	
TOTAL SHOULDER	196.28	90.88	3937.00	3913.00	
TOTAL SHD / WT	1.18	0.55	3937.00	3913.00	
LF LAP BELT	55.65	16.69	4003.00	3908.00	8
RT LAP BELT	84.90	20.10	4000.00	3901.00	9
TOTAL LAP	119.91	37.70	4001.00	3901.00	
TOTAL LAP / WT	0.72	0.23	4001.00	3901.00	
CROTCH STRAP	90.83	-42.52	4000.00	3914.00	10
LF SEAT LNK X	45.45	-160.61	3852.00	3906.00	18
RT SEAT LNK X	42.73	-21.60	3860.00	3906.00	19
TOTAL SEAT X	71.74	-182.21	3827.00	3906.00	
SEAT LNK Y	76.07	-50.43	3967.00	3915.00	35
LF SEAT PAN Z	450.32	17.02	3914.00	3634.00	11
RT SEAT PAN Z	274.43	6.29	3906.00	3620.00	12
CT SEAT PAN Z	736.53	47.32	3909.00	3611.00	13
TOTAL SEAT Z	1461.49	85.01	3914.00	3623.00	
TOTAL SEAT Z / WT	8.80	0.51	3914.00	3623.00	
RES SEAT FORCE	1472.54	105.96	3914.00	3623.00	
RES SEAT FORCE / WT	8.87	0.64	3914.00	3623.00	
LF FOOT X	-70.94	-278.89	4197.00	3908.00	20
RT FOOT X	-36.16	-254.69	4194.00	3910.00	23
CT FOOT X	-106.79	-340.24	4194.00	3911.00	26
TOTAL FOOT X	-215.70	-863.92	4194.00	3910.00	
LF FOOT Y	188.46	-22.05	3894.00	4187.00	21
RT FOOT Y	29.46	-205.71	4113.00	3893.00	24
CT FOOT Y	13.53	-56.78	3932.00	3910.00	27
TOTAL FOOT Y	97.94	-87.59	3859.00	3912.00	
LF FOOT Z	288.97	58.01	3894.00	3848.00	22
RT FOOT Z	317.28	65.56	3910.00	4167.00	25
CT FOOT Z	82.27	-170.70	3901.00	3870.00	28
TOTAL FOOT Z	845.09	27.98	3902.00	3848.00	
RES FOOT FORCE	1018.97	237.68	3911.00	4197.00	

HEAD REST POS STUDY TEST: 339 SUBJ: F-2 WT: 159.0 G: 10 GP: 1 CELL: B

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	2414.00	350.00	48
CARRIAGE X	1.35	-0.77	3900.00	3892.00	36
CARRIAGE Y	0.64	-0.70	3898.00	9941.00	31
CARRIAGE Z	12.54	-0.19	3893.00	3697.00	1
CARRIAGE Z (SM)	10.64	-0.10	3894.00	3698.00	
CARRIAGE VEL	-1.17	-25.51	4164.00	3847.00	29
SEAT X	8.35	-10.54	3864.00	3622.00	32
SEAT Y	0.73	-0.87	3862.00	3867.00	33
SEAT Z	11.59	-0.35	3900.00	3717.00	34
SEAT Z (SM)	10.65	-0.19	3900.00	3688.00	
CHEST X	9.31	-0.97	3915.00	3948.00	5
CHEST Y	-0.48	-4.65	3896.00	3916.00	6
CHEST Z	19.68	-1.07	3919.00	3801.00	7
CHEST RES	20.34	0.85	3919.00	3717.00	
CHEST SI	98.01		3857.00	3988.00	
HEAD X	1.67	-1.95	3918.00	3949.00	2
HEAD Y	0.59	-0.96	4180.00	3906.00	3
HEAD Z	13.69	-0.46	3913.00	3828.00	4
HEAD RES	14.01	0.47	3913.00	4126.00	
HEAD SI	24.02		3863.00	4112.00	
HEAD HIC	18.99		3887.00	9952.00	
SHD REFL LF	40.29	13.21	3893.00	3980.00	14
SHD REEL LF	42.42	10.01	3999.00	3913.00	16
LF SHOULDER	64.53	38.00	4000.00	3979.00	
SHD REFL RT	47.90	21.53	3936.00	3984.00	15
SHD REEL RT	39.65	6.97	3939.00	3902.00	17
RT SHOULDER	86.30	34.60	3938.00	3971.00	
TOTAL SHLD REFL	80.71	35.26	3935.00	3982.00	
TOTAL SHLD REEL	77.97	17.96	3999.00	3904.00	
TOTAL SHOULDER	136.69	77.50	3937.00	3970.00	
TOTAL SHD / WT	0.86	0.49	3937.00	3970.00	
LF LAP BELT	34.22	8.90	4002.00	3898.00	8
RT LAP BELT	29.08	10.43	3999.00	3900.00	9
TOTAL LAP	62.37	19.67	4000.00	3899.00	
TOTAL LAP / WT	0.39	0.12	4000.00	3899.00	
CROTCH STRAP	230.14	8.37	4003.00	3911.00	10
LF SEAT LNK X	-0.61	-126.67	3679.00	3909.00	18
RT SEAT LNK X	9.14	-201.60	3620.00	3909.00	19
TOTAL SEAT X	-1.50	-328.26	3647.00	3909.00	
SEAT LNK Y	92.81	-8.96	3932.00	4025.00	35
LF SEAT PAN Z	398.52	22.15	3910.00	3688.00	11
RT SEAT PAN Z	564.95	33.77	3913.00	3659.00	12
CT SEAT PAN Z	657.68	31.49	3917.00	3720.00	13
TOTAL SEAT Z	1613.10	92.19	3913.00	3659.00	
TOTAL SEAT Z / WT	10.15	0.58	3913.00	3659.00	
RES SEAT FORCE	1645.51	92.68	3913.00	3659.00	
RES SEAT FORCE / WT	10.35	0.58	3913.00	3659.00	
LF FOOT X	5.57	-98.40	3861.00	3910.00	20
RT FOOT X	6.52	-150.33	3860.00	3911.00	23
CT FOOT X	19.89	-166.15	3861.00	3911.00	26
TOTAL FOOT X	29.34	-409.45	3861.00	3911.00	
LF FOOT Y	129.87	-23.86	3904.00	3851.00	21
RT FOOT Y	14.11	-166.04	3860.00	3894.00	24
CT FOOT Y	51.28	-8.35	3884.00	3849.00	27
TOTAL FOOT Y	69.97	-67.83	3884.00	3867.00	
LF FOOT Z	201.82	-21.98	3896.00	3853.00	22
RT FOOT Z	215.00	17.77	3912.00	3966.00	25
CT FOOT Z	215.23	-61.53	3900.00	3853.00	28
TOTAL FOOT Z	541.41	-34.08	3904.00	3852.00	
RES FOOT FORCE	648.94	80.61	3913.00	4134.00	

HEAD REST POS STUDY TEST: 351 SUBJ: G-3 WT: 158.0 G: 10 GP: 2 CELL: B

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.06	9.96	923.00	1134.00	48
CARRIAGE X	1.54	-0.83	3879.00	3847.00	36
CARRIAGE Y	0.89	-0.89	9880.00	3983.00	31
CARRIAGE Z	12.06	-0.30	3871.00	3698.00	1
CARRIAGE Z (SM)	10.64	-0.11	3872.00	3698.00	
CARRIAGE VEL	-0.81	-25.62	4150.00	3843.00	29
SEAT X	1.97	-1.26	3841.00	3848.00	32
SEAT Y	1.10	-1.28	3837.00	3843.00	33
SEAT Z	11.35	-0.27	3878.00	3710.00	34
SEAT Z (SM)	10.56	-0.14	3879.00	3711.00	
CHEST X	2.89	-2.74	3887.00	3933.00	5
CHEST Y	0.29	-2.29	3883.00	3912.00	6
CHEST Z	21.60	-1.25	3916.00	3794.00	7
CHEST RES	21.70	0.75	3916.00	4112.00	
CHEST SI	34.22		3835.00	3995.00	
HEAD X	1.22	-3.12	3943.00	3926.00	2
HEAD Y	1.46	0.15	3986.00	3952.00	3
HEAD Z	12.12	-1.80	3896.00	3657.00	4
HEAD RES	12.19	0.66	3896.00	3964.00	
HEAD SI	18.24		3847.00	3848.00	
HEAD HIC	15.58		3869.00	3932.00	
SHD REFL LF	71.40	18.72	3923.00	4000.00	14
SHD REEL LF	48.85	9.79	3922.00	3875.00	16
LF SHOULDER	121.01	40.00	3922.00	4000.00	
SHD REFL RT	56.31	22.52	3921.00	4008.00	15
SHD REEL RT	49.85	1.83	3925.00	3893.00	17
RT SHOULDER	104.21	35.78	3922.00	3891.00	
TOTAL SHLD REFL	128.99	43.18	3921.00	4001.00	
TOTAL SHLD REEL	98.73	7.34	3923.00	3892.00	
TOTAL SHOULDER	225.22	82.31	3922.00	3875.00	
TOTAL SHD / WT	1.43	0.52	3922.00	3875.00	
LF LAP BELT	56.01	10.06	3984.00	3893.00	8
RT LAP BELT	84.13	13.09	3984.00	3884.00	9
TOTAL LAP	120.15	23.89	3984.00	3894.00	
TOTAL LAP / WT	0.76	0.15	3984.00	3894.00	
CROTCH STRAP	73.77	-33.81	3989.00	3898.00	10
LF SEAT LNK X	90.21	-154.56	3693.00	3886.00	18
RT SEAT LNK X	11.85	-192.89	3762.00	3890.00	19
TOTAL SEAT X	35.25	-286.89	3815.00	3886.00	
SEAT LNK Y	48.92	-59.43	3970.00	3898.00	35
LF SEAT PAN Z	666.35	74.44	3896.00	3621.00	11
RT SEAT PAN Z	661.24	70.31	3894.00	3617.00	12
CT SEAT PAN Z	998.78	29.16	3898.00	3606.00	13
TOTAL SEAT Z	1683.42	182.31	3898.00	3601.00	
TOTAL SEAT Z / WT	10.53	1.15	3896.00	3601.00	
RES SEAT FORCE	1686.50	184.40	3896.00	3601.00	
RES SEAT FORCE / WT	10.87	1.17	3896.00	3601.00	
LF FOOT X	2.84	-118.42	3838.00	3888.00	20
RT FOOT X	7.75	-130.59	3838.00	3890.00	23
CT FOOT X	18.98	-135.75	3840.00	3886.00	26
TOTAL FOOT X	23.17	-377.77	3839.00	3889.00	
LF FOOT Y	141.82	-21.52	3874.00	3821.00	21
RT FOOT Y	24.94	-139.24	4074.00	3892.00	24
CT FOOT Y	17.64	-45.55	4178.00	3890.00	27
TOTAL FOOT Y	64.86	-80.09	3861.00	3895.00	
LF FOOT Z	181.56	-5.55	3898.00	3831.00	22
RT FOOT Z	210.07	0.53	3897.00	3849.00	25
CT FOOT Z	159.08	-73.00	3877.00	3850.00	28
TOTAL FOOT Z	456.19	-37.88	3875.00	3850.00	
RES FOOT FORCE	570.21	82.47	3898.00	3968.00	

HEAD REST POS STUDY TEST: 426 SUBJ: G-2 WT: 120.0 G: 10 GP: 2 CELL: B

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	2317.00	1193.00	48
CARRIAGE X	1.20	-0.92	3831.00	3868.00	36
CARRIAGE Y	0.78	-0.95	3879.00	3925.00	31
CARRIAGE Z	12.48	-0.32	3868.00	3664.00	1
CARRIAGE Z (SM)	10.67	-0.11	3869.00	3665.00	
CARRIAGE VEL	-0.88	-25.68	4106.00	3828.00	29
SEAT X	1.29	-1.20	3832.00	3868.00	32
SEAT Y	0.87	-1.40	3851.00	3843.00	33
SEAT Z	11.53	-0.21	3875.00	3671.00	34
SEAT Z (SM)	10.69	-0.13	3876.00	3674.00	
CHEST X	9.21	-1.07	3892.00	3922.00	5
CHEST Y	-0.14	-1.88	3887.00	3973.00	6
CHEST Z	15.77	-1.11	3903.00	3691.00	7
CHEST RES	15.80	1.10	3903.00	3720.00	
CHEST SI	27.48		3833.00	3979.00	
HEAD X	1.21	-1.15	3884.00	3904.00	2
HEAD Y	1.09	-0.94	3972.00	3895.00	3
HEAD Z	14.28	-0.80	3888.00	3670.00	4
HEAD RES	14.30	0.36	3888.00	4129.00	
HEAD SI	22.30		3843.00	3961.00	
HEAD HIC	18.48		3866.00	3928.00	
SHD REFL LF	47.38	10.93	3908.00	3972.00	14
SHD REEL LF	90.01	7.69	3916.00	3871.00	16
LF SHOULDER	71.27	29.35	3915.00	3954.00	
SHD REFL RT	94.88	13.43	3913.00	3999.00	15
SHD REEL RT	36.08	2.42	3974.00	3883.00	17
RT SHOULDER	60.97	25.62	3916.00	4009.00	
TOTAL SHLD REFL	78.90	27.76	3910.00	3981.00	
TOTAL SHLD REEL	60.91	11.46	3975.00	3881.00	
TOTAL SHOULDER	132.10	56.35	3916.00	3999.00	
TOTAL SHD / WT	1.10	0.47	3916.00	3999.00	
LF LAP BELT	28.84	0.32	3973.00	3879.00	8
RT LAP BELT	28.78	3.81	3977.00	3878.00	9
TOTAL LAP	57.31	4.28	3975.00	3879.00	
TOTAL LAP / WT	0.48	0.04	3975.00	3879.00	
CROTCH STRAP	62.08	-23.90	3975.00	3888.00	10
LF SEAT LNK X	40.68	-89.40	3983.00	3882.00	18
RT SEAT LNK X	39.78	-35.08	3839.00	3906.00	19
TOTAL SEAT X	60.49	-118.43	3801.00	3891.00	
SEAT LNK Y	45.72	-20.86	3941.00	3848.00	35
LF SEAT PAN Z	323.65	19.43	3885.00	3633.00	11
RT SEAT PAN Z	374.97	15.82	3885.00	3692.00	12
CT SEAT PAN Z	485.63	26.58	3893.00	3675.00	13
TOTAL SEAT Z	1143.51	74.90	3885.00	3667.00	
TOTAL SEAT Z / WT	9.53	0.62	3885.00	3667.00	
RES SEAT FORCE	1148.93	90.05	3885.00	3605.00	
RES SEAT FORCE / WT	9.57	0.75	3885.00	3605.00	
LF FOOT X	-0.91	-94.34	3836.00	3886.00	20
RT FOOT X	-10.12	-145.82	4090.00	3886.00	23
CT FOOT X	-8.75	-166.16	4174.00	3882.00	26
TOTAL FOOT X	-45.82	-400.06	3836.00	3886.00	
LF FOOT Y	113.88	-27.62	3870.00	3952.00	21
RT FOOT Y	21.21	-150.06	3849.00	3879.00	24
CT FOOT Y	51.51	-20.58	3834.00	3945.00	27
TOTAL FOOT Y	66.19	-52.14	3853.00	3882.00	
LF FOOT Z	166.14	-17.63	3872.00	3844.00	22
RT FOOT Z	183.59	7.76	3879.00	4140.00	25
CT FOOT Z	132.19	-95.76	3877.00	3828.00	28
TOTAL FOOT Z	430.54	-47.95	3879.00	3828.00	
RES FOOT FORCE	527.28	54.42	3879.00	4147.00	

HEAD REST POS STUDY TEST: 390 SUBJ: K-1 WT: 175.0 G: 10 GP: 2 CELL: B

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	1098.00	452.00	48
CARRIAGE X	1.48	-0.75	3838.00	3987.00	56
CARRIAGE Y	0.56	-0.54	3838.00	3982.00	31
CARRIAGE Z	12.25	-0.27	3831.00	3616.00	1
CARRIAGE Z (SM)	10.51	-0.11	3831.00	3616.00	
CARRIAGE VEL	-0.88	-25.59	4124.00	3801.00	29
SEAT X	1.25	-1.18	3838.00	3845.00	32
SEAT Y	0.86	-1.03	3805.00	3872.00	33
SEAT Z	11.13	-0.24	3838.00	3649.00	34
SEAT Z (SM)	10.56	-0.15	3839.00	3648.00	
CHEST X	5.42	-0.85	3855.00	3904.00	5
CHEST Y	0.42	-1.30	3842.00	3912.00	6
CHEST Z	18.17	-0.91	3860.00	3922.00	7
CHEST RES	18.73	0.56	3860.00	3936.00	
CHEST SI	31.60		3799.00	3919.00	
HEAD X	0.63	-4.77	3944.00	3876.00	2
HEAD Y	1.38	-1.59	3758.00	3862.00	3
HEAD Z	12.50	-1.26	3853.00	3605.00	4
HEAD RES	12.81	0.61	3854.00	4184.00	
HEAD SI	18.16		3809.00	3906.00	
HEAD HIC	16.16		3827.00	3888.00	
SHD REFL LF	40.15	12.36	3870.00	4097.00	14
SHD REEL LF	32.18	6.65	3938.00	3860.00	16
LF SHOULDER	57.69	27.03	3874.00	4033.00	
SHD REFL RT	33.66	14.77	3860.00	3923.00	15
SHD REEL RT	96.54	6.86	3935.00	3853.00	17
RT SHOULDER	56.03	32.22	3887.00	3834.00	
TOTAL SHLD REFL	73.31	31.20	3859.00	3924.00	
TOTAL SHLD REEL	68.04	13.91	3936.00	3850.00	
TOTAL SHOULDER	107.22	60.91	3886.00	3972.00	
TOTAL SHD / WT	0.61	0.35	3886.00	3972.00	
LF LAP BELT	57.86	27.20	3929.00	3842.00	8
RT LAP BELT	77.89	35.34	3934.00	4017.00	9
TOTAL LAP	133.60	64.63	3932.00	4019.00	
TOTAL LAP / WT	0.76	0.37	3932.00	4019.00	
CROTCH STRAP	114.13	-63.18	3940.00	3854.00	10
LF SEAT LNK X	37.29	-134.24	3665.00	3846.00	18
RT SEAT LNK X	-4.19	-142.07	3610.00	3847.00	19
TOTAL SEAT X	26.57	-275.73	3628.00	3847.00	
SEAT LNK Y	62.78	-47.99	3908.00	3846.00	35
LF SEAT PAN Z	584.55	60.95	3855.00	3603.00	11
RT SEAT PAN Z	626.21	62.27	3854.00	3608.00	12
CT SEAT PAN Z	617.90	45.49	3855.00	3610.00	13
TOTAL SEAT Z	1824.31	182.97	3854.00	3603.00	
TOTAL SEAT Z / WT	10.42	1.05	3854.00	3603.00	
RES SEAT FORCE	1844.09	166.23	3854.00	3603.00	
RES SEAT FORCE / WT	10.54	1.06	3854.00	3603.00	
LF FOOT X	-21.90	-185.85	3794.00	3849.00	20
RT FOOT X	-11.26	-170.75	3621.00	3850.00	23
CT FOOT X	-15.49	-234.62	4067.00	3849.00	26
TOTAL FOOT X	-78.37	-589.47	3793.00	3849.00	
LF FOOT Y	167.58	-21.96	3842.00	4117.00	21
RT FOOT Y	24.90	-157.91	3619.00	3834.00	24
CT FOOT Y	13.06	-36.77	3901.00	3851.00	27
TOTAL FOOT Y	34.96	-59.28	3901.00	3851.00	
LF FOOT Z	237.07	17.30	3834.00	3784.00	22
RT FOOT Z	251.14	13.24	3834.00	4118.00	25
CT FOOT Z	169.44	-63.25	3838.00	3785.00	28
TOTAL FOOT Z	593.68	5.51	3834.00	4118.00	
RES FOOT FORCE	729.68	103.46	3834.00	4063.00	

HEAD REST POS STUDY TEST: 383 SUBJ: M-2 WT: 166.0 G: 10 GP: 1 CELL: B

DATA ID	MAX	MIN	T1	T2	CM
10V EXT PWR	10.05	9.96	226.00	1041.00	48
CARRIAGE X	1.64	-0.74	3856.00	3858.00	36
CARRIAGE Y	0.41	-0.82	3874.00	3840.00	31
CARRIAGE Z	12.48	-0.22	3858.00	3670.00	1
CARRIAGE Z (SM)	10.67	-0.13	3858.00	3669.00	
CARRIAGE VEL	-1.13	-25.75	4183.00	3828.00	29
SEAT X	1.34	-1.20	3826.00	3879.00	32
SEAT Y	0.79	-0.94	3825.00	3830.00	33
SEAT Z	11.63	-0.23	3866.00	3677.00	34
SEAT Z (SM)	10.69	-0.13	3866.00	3693.00	
CHEST X	2.10	-2.83	3874.00	3920.00	5
CHEST Y	0.95	-2.79	3879.00	3871.00	6
CHEST Z	28.19	-2.57	3893.00	3872.00	7
CHEST RES	28.23	0.62	3893.00	4089.00	
CHEST SI	44.10		3827.00	3955.00	
HEAD X	3.93	-1.86	3880.00	3926.00	2
HEAD Y	1.42	-1.68	3968.00	3879.00	3
HEAD Z	11.73	-1.20	3878.00	3505.00	4
HEAD RES	12.40	0.58	3878.00	4199.00	
HEAD SI	16.73		3833.00	3956.00	
HEAD HIC	13.39		3854.00	3918.00	
SHD REFL LF	38.48	12.81	3915.00	4100.00	14
SHD REEL LF	92.66	8.13	3916.00	3860.00	16
LF SHOULDER	71.29	33.90	3915.00	3860.00	
SHD REFL RT	45.37	23.96	3899.00	3947.00	15
SHD REEL RT	46.23	11.85	3973.00	3862.00	17
RT SHOULDER	80.43	46.49	3918.00	3860.00	
TOTAL SHLD REFL	81.58	43.98	3898.00	3967.00	
TOTAL SHLD REEL	77.28	20.11	3918.00	3861.00	
TOTAL SHOULDER	151.28	80.39	3917.00	3860.00	
TOTAL SHD / WT	0.91	0.48	3917.00	3860.00	
LF LAP BELT	62.10	19.63	3975.00	3867.00	8
RT LAP BELT	82.76	24.74	4040.00	3866.00	9
TOTAL LAP	122.37	44.42	3975.00	3866.00	
TOTAL LAP / WT	0.74	0.27	3975.00	3866.00	
CROTCH STRAP	35.23	-70.84	3975.00	3878.00	10
LF SEAT LNK X	47.52	-136.67	3977.00	3873.00	18
RT SEAT LNK X	16.28	-115.47	3828.00	3879.00	19
TOTAL SEAT X	38.60	-250.99	3959.00	3879.00	
SEAT LNK Y	69.11	-54.97	3945.00	3875.00	35
LF SEAT PAN Z	444.32	54.78	3878.00	3603.00	11
RT SEAT PAN Z	439.40	41.67	3881.00	3612.00	12
CT SEAT PAN Z	784.14	68.43	3882.00	3609.00	13
TOTAL SEAT Z	1661.58	174.61	3880.00	3601.00	
TOTAL SEAT Z / WT	10.01	1.05	3880.00	3601.00	
RES SEAT FORCE	1681.00	177.50	3880.00	3601.00	
RES SEAT FORCE / WT	10.13	1.07	3880.00	3601.00	
LF FOOT X	1.85	-107.77	3824.00	3877.00	20
RT FOOT X	-2.06	-152.74	3824.00	3878.00	23
CT FOOT X	-4.62	-196.02	3824.00	3879.00	26
TOTAL FOOT X	-5.05	-452.08	3824.00	3877.00	
LF FOOT Y	132.91	-33.05	3870.00	3833.00	21
RT FOOT Y	15.73	-185.72	4130.00	3870.00	24
CT FOOT Y	48.43	-24.54	3898.00	3866.00	27
TOTAL FOOT Y	53.27	-73.11	3970.00	3877.00	
LF FOOT Z	178.55	5.13	3862.00	3832.00	22
RT FOOT Z	218.20	8.85	3878.00	3602.00	25
CT FOOT Z	221.98	-51.20	3869.00	3817.00	28
TOTAL FOOT Z	581.84	-4.32	3870.00	3817.00	
RES FOOT FORCE	685.87	75.89	3879.00	3669.00	

HEAD REST POS STUDY TEST: 423 SUBJ: M11 WT: 155.0 G: 10 GP: 1 CELL: B

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	211.00	590.00	48
CARRIAGE X	1.27	-0.96	3885.00	3893.00	36
CARRIAGE Y	0.94	-0.67	3882.00	3991.00	31
CARRIAGE Z	12.47	-0.21	3878.00	3666.00	1
CARRIAGE Z (SM)	10.44	-0.12	3894.00	3666.00	
CARRIAGE VEL	-1.16	-25.59	4163.00	3852.00	29
SEAT X	1.03	-1.33	3841.00	3892.00	32
SEAT Y	1.09	-1.16	3992.00	9997.00	99
SEAT Z	11.73	-0.22	3885.00	3694.00	34
SEAT Z (SM)	10.65	-0.12	3885.00	3695.00	
CHEST X	5.37	-2.48	3903.00	3932.00	5
CHEST Y	0.88	-1.58	3879.00	3962.00	6
CHEST Z	19.62	-1.17	3911.00	3977.00	7
CHEST RES	19.79	0.57	3911.00	3753.00	
CHEST SI	36.92		3841.00	3981.00	
HEAD X	1.31	-1.64	3906.00	3930.00	2
HEAD Y	1.11	-1.75	4190.00	3913.00	3
HEAD Z	14.54	-1.18	3909.00	9688.00	4
HEAD RES	14.67	0.41	3903.00	4100.00	
HEAD SI	20.79		3855.00	3958.00	
HEAD HIC	17.23		3881.00	3925.00	
SHD REFL LF	41.21	7.73	3919.00	3981.00	14
SHD REEL LF	42.94	8.71	3930.00	3883.00	16
LF SHOULDER	81.59	20.07	3927.00	3969.00	
SHD REFL RT	47.32	21.06	3918.00	3965.00	15
SHD REEL RT	54.73	9.46	3927.00	3889.00	17
RT SHOULDER	101.05	39.54	3926.00	3882.00	
TOTAL SHLD REFL	88.52	29.89	3918.00	3971.00	
TOTAL SHLD REEL	96.67	18.44	3928.00	3882.00	
TOTAL SHOULDER	182.46	70.78	3927.00	3967.00	
TOTAL SHD / WT	1.18	0.46	3927.00	3967.00	
LF LAP BELT	39.74	5.31	4001.00	3878.00	8
RT LAP BELT	36.06	7.55	4007.00	3881.00	9
TOTAL LAP	77.46	14.02	4001.00	3880.00	
TOTAL LAP / WT	0.50	0.09	4001.00	3880.00	
CROTCH STRAP	136.16	-17.96	4097.00	3903.00	10
LF SEAT LNK X	22.76	-218.99	4099.00	3898.00	18
RT SEAT LNK X	97.13	-87.20	3942.00	3893.00	19
TOTAL SEAT X	24.76	-304.42	4106.00	3894.00	
SEAT LNK Y	63.34	-102.51	4106.00	3898.00	35
LF SEAT PAN Z	468.43	18.72	3903.00	3602.00	11
RT SEAT PAN Z	483.65	14.80	3901.00	3611.00	12
CT SEAT PAN Z	700.26	34.67	3903.00	3620.00	13
TOTAL SEAT Z	1646.17	86.89	3903.00	3620.00	
TOTAL SEAT Z / WT	10.62	0.56	3903.00	3620.00	
RES SEAT FORCE	1673.09	89.29	3903.00	3620.00	
RES SEAT FORCE / WT	10.79	0.58	3903.00	3620.00	
LF FOOT X	-7.00	-157.08	3995.00	3896.00	20
RT FOOT X	0.37	-122.99	3844.00	3916.00	23
CT FOOT X	5.49	-175.18	3995.00	3907.00	26
TOTAL FOOT X	-2.90	-445.37	3995.00	3916.00	
LF FOOT Y	139.04	-21.68	3881.00	4059.00	21
RT FOOT Y	22.20	-142.86	3703.00	3896.00	24
CT FOOT Y	21.82	-41.37	3846.00	3902.00	27
TOTAL FOOT Y	37.33	-50.63	3859.00	3900.00	
LF FOOT Z	201.30	-14.79	3882.00	4011.00	22
RT FOOT Z	223.75	-15.38	3906.00	3994.00	25
CT FOOT Z	125.02	-64.46	3888.00	3835.00	28
TOTAL FOOT Z	473.72	-29.51	3907.00	3994.00	
RES FOOT FORCE	643.47	11.38	3906.00	3995.00	

HEAD REST POS STUDY TEST: 381 SUBJ: M10 WT: 142.0 G: 10 GP: 2 CELL: B

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	3344.00	3221.00	48
CARRIAGE X	1.34	-0.97	3902.00	3875.00	36
CARRIAGE Y	0.62	-0.95	3901.00	4008.00	31
CARRIAGE Z	12.32	-0.17	3895.00	3658.00	1
CARRIAGE Z (SM)	10.50	-0.07	3896.00	3799.00	
CARRIAGE VEL	-1.22	-25.69	4178.00	3853.00	29
SEAT X	1.70	-1.24	3861.00	3876.00	32
SEAT Y	0.68	-0.92	3965.00	3919.00	33
SEAT Z	11.56	-0.25	3902.00	3711.00	34
SEAT Z (SM)	10.55	-0.15	3903.00	3710.00	
CHEST X	5.05	-1.26	3919.00	3954.00	5
CHEST Y	0.75	-2.89	3899.00	3914.00	6
CHEST Z	14.44	-1.12	3927.00	3840.00	7
CHEST RES	14.80	0.83	3927.00	3840.00	
CHEST SI	27.98		3861.00	3995.00	
HEAD X	9.92	-0.08	3915.00	3848.00	2
HEAD Y	0.78	-1.86	4011.00	3913.00	3
HEAD Z	13.49	-0.60	3912.00	3735.00	4
HEAD RES	14.09	0.49	3914.00	3680.00	
HEAD SI	23.48		3867.00	4094.00	
HEAD HIC	18.63		3868.00	3945.00	
SHD REFL LF	25.56	8.28	3931.00	3989.00	14
SHD REEL LF	20.78	3.10	4019.00	3917.00	16
LF SHOULDER	36.90	14.34	3951.00	3989.00	
SHD REFL RT	38.10	16.28	3940.00	3981.00	15
SHD REEL RT	46.12	3.33	3948.00	3908.00	17
RT SHOULDER	80.10	25.27	3944.00	4036.00	
TOTAL SHLD REFL	82.87	25.88	3941.00	3989.00	
TOTAL SHLD REEL	60.59	6.91	3949.00	3908.00	
TOTAL SHOULDER	114.26	47.74	3943.00	4043.00	
TOTAL SHD / WT	0.80	0.34	3943.00	4043.00	
LF LAP BELT	39.83	15.99	4007.00	3906.00	8
RT LAP BELT	55.76	24.41	4011.00	3907.00	9
TOTAL LAP	94.81	40.58	4011.00	3906.00	
TOTAL LAP / WT	0.67	0.29	4011.00	3906.00	
CROTCH STRAP	8.15	-91.20	4009.00	3914.00	10
LF SEAT LNK X	48.80	-136.54	4186.00	3909.00	18
RT SEAT LNK X	28.69	-83.89	3959.00	3908.00	19
TOTAL SEAT X	60.02	-218.57	4139.00	3909.00	
SEAT LNK Y	55.08	-65.37	3970.00	3909.00	35
LF SEAT PAN Z	371.97	10.27	3906.00	3606.00	11
RT SEAT PAN Z	387.43	11.42	3910.00	3696.00	12
CT SEAT PAN Z	780.82	37.23	3914.00	3623.00	13
TOTAL SEAT Z	1527.30	75.06	3912.00	3606.00	
TOTAL SEAT Z / WT	10.76	0.53	3912.00	3606.00	
RES SEAT FORCE	1543.03	80.85	3912.00	3686.00	
RES SEAT FORCE / WT	10.87	0.57	3912.00	3686.00	
LF FOOT X	-9.02	-160.34	3608.00	3913.00	20
RT FOOT X	11.72	-101.95	3859.00	3913.00	23
CT FOOT X	-1.36	-178.45	3859.00	3914.00	26
TOTAL FOOT X	-8.84	-436.27	3859.00	3913.00	
LF FOOT Y	156.42	-17.40	3906.00	3850.00	21
RT FOOT Y	24.26	-199.02	3729.00	3897.00	24
CT FOOT Y	18.14	-52.17	3715.00	3918.00	27
TOTAL FOOT Y	40.73	-70.02	3883.00	3917.00	
LF FOOT Z	179.41	-11.27	3906.00	3852.00	22
RT FOOT Z	177.80	0.51	3898.00	4002.00	25
CT FOOT Z	154.44	-89.84	3917.00	3875.00	28
TOTAL FOOT Z	495.17	-59.6[illegible]	3905.00	3853.00	
RES FOOT FORCE	592.31	38.11	3906.00	3650.00	

HEAD REST POS STUDY TEST: 421 SUBJ: H13 WT: 170.0 G: 10 GP: 1 CELL: B

DATA ID	MAX	MIN	T1	T2	Ch
10V EXT PWR	10.04	9.96	187.00	462.00	
CARRIAGE X	1.21	-0.82	3902.00	3953.00	48
CARRIAGE Y	0.43	-0.60	3914.00	3995.00	36
CARRIAGE Z	11.69	-0.24	3894.00	3715.00	31
CARRIAGE Z (SM)	10.49	-0.07	3910.00	3717.00	1
CARRIAGE VEL	-1.02	-25.58	4189.00	3854.00	
SEAT X	1.07	-1.32	3857.00	3909.00	29
SEAT Y	0.68	-1.01	3987.00	3867.00	32
SEAT Z	11.55	-0.26	3901.00	3693.00	33
SEAT Z (SM)	10.66	-0.15	3901.00	3713.00	34
CHEST X	3.67	-1.54	3910.00	3938.00	
CHEST Y	0.26	-3.18	3895.00	3909.00	5
CHEST Z	22.64	-0.99	3923.00	3822.00	6
CHEST RES	22.74	0.73	3923.00	3827.00	7
CHEST SI	41.60		3865.00	4002.00	
HEAD X	1.04	-1.37	3918.00	3939.00	
HEAD Y	1.36	-0.26	4012.00	3909.00	2
HEAD Z	13.10	-1.29	3917.00	3608.00	3
HEAD RES	13.14	0.81	3917.00	4177.00	4
HEAD SI	18.11		3873.00	3971.00	
HEAD HIC	14.92		3891.00	3948.00	
SHD REFL LF	54.22	13.34	3935.00	4005.00	
SHD REEL LF	40.71	9.89	4100.00	3897.00	14
LF SHOULDER	92.98	36.97	3938.00	3980.00	16
SHD REFL RT	45.29	18.25	3935.00	3985.00	
SHD REEL RT	45.54	3.76	3941.00	3908.00	15
RT SHOULDER	83.45	37.43	3940.00	3972.00	17
TOTAL SHLD REFL	99.51	33.86	3935.00	3995.00	
TOTAL SHLD REEL	86.10	14.45	3940.00	3908.00	
TOTAL SHOULDER	181.73	76.98	3939.00	3978.00	
TOTAL SHD / WT	1.07	0.45	3939.00	3978.00	
LF LAP BELT	31.97	3.42	4085.00	3906.00	8
RT LAP BELT	42.33	8.15	4095.00	3905.00	9
TOTAL LAP	71.89	11.56	4095.00	3906.00	
TOTAL LAP / WT	0.42	0.07	4095.00	3906.00	
CROTCH STRAP	131.76	-0.76	4095.00	3906.00	10
LF SEAT LNK X	33.56	-231.79	4141.00	3910.00	18
RT SEAT LNK X	7.92	-132.49	3823.00	3911.00	19
TOTAL SEAT X	16.64	-363.05	3761.00	3910.00	
SEAT LNK Y	57.73	-69.38	3982.00	3914.00	35
LF SEAT PAN Z	404.89	18.25	3912.00	3660.00	11
RT SEAT PAN Z	397.60	14.05	3912.00	3607.00	12
CT SEAT PAN Z	865.40	38.85	3918.00	3610.00	13
TOTAL SEAT Z	1654.81	80.04	3912.00	3607.00	
TOTAL SEAT Z / WT	9.73	0.47	3912.00	3607.00	
RES SEAT FORCE	1693.96	81.49	3912.00	3607.00	
RES SEAT FORCE / WT	9.96	0.48	3912.00	3607.00	
LF FOOT X	-38.56	-183.95	3997.00	3911.00	20
RT FOOT X	-9.85	-135.86	3854.00	3913.00	23
CT FOOT X	-24.04	-211.87	3989.00	3914.00	26
TOTAL FOOT X	-79.29	-526.29	3997.00	3913.00	
LF FOOT Y	150.99	-30.69	3897.00	3794.00	21
RT FOOT Y	21.60	-156.77	3836.00	3897.00	24
CT FOOT Y	33.02	-35.51	3720.00	3918.00	27
TOTAL FOOT Y	46.83	-52.82	4029.00	3917.00	
LF FOOT Z	232.69	-2.41	3897.00	3998.00	22
RT FOOT Z	271.51	3.92	3922.00	4006.00	25
CT FOOT Z	161.76	-145.95	3918.00	3614.00	28
TOTAL FOOT Z	618.26	-14.69	3921.00	4007.00	
RES FOOT FORCE	779.54	82.43	3922.00	3997.00	

HEAD REST POS STUDY TEST: 379 SUBJ: R-2 WT: 145.0 G: 10 GP: 1 CELL: B

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	2313.00	1420.00	48
CARRIAGE X	1.25	-0.78	3915.00	3924.00	36
CARRIAGE Y	0.30	-1.27	3912.00	4018.00	31
CARRIAGE Z	12.13	-0.22	3908.00	3696.00	1
CARRIAGE Z (SM)	10.52	-0.09	3924.00	3696.00	
CARRIAGE VEL	-1.16	-25.63	4141.00	3874.00	29
SEAT X	2.04	-1.45	3875.00	3923.00	32
SEAT Y	0.91	-1.04	3982.00	3934.00	33
SEAT Z	12.46	-0.19	3915.00	3699.00	34
SEAT Z (SM)	10.93	-0.09	3916.00	3701.00	
CHEST X	3.34	-0.43	3917.00	3606.00	5
CHEST Y	-0.20	-2.08	3924.00	3945.00	6
CHEST Z	15.33	-1.12	3947.00	3626.00	7
CHEST RES	15.61	0.75	3947.00	3740.00	
CHEST SI	22.76		3877.00	4007.00	
HEAD X	.93	-2.07	3891.00	3954.00	2
HEAD Y	1.36	0.27	4055.00	3939.00	3
HEAD Z	19.78	-1.15	3925.00	3845.00	4
HEAD RES	13.79	0.80	3925.00	4006.00	
HEAD SI	18.18		3883.00	3992.00	
HEAD HIC	15.52		3900.00	3970.00	
SHD REFL LF	48.30	20.43	3946.00	4012.00	14
SHD REEL LF	33.35	9.46	4003.00	3911.00	16
LF SHOULDER	79.76	40.20	3947.00	3910.00	
SHD REFL RT	40.72	17.10	3942.00	3994.00	15
SHD REEL RT	30.63	9.55	4013.00	3926.00	17
RT SHOULDER	68.63	36.38	3951.00	4050.00	
TOTAL SHLD REFL	87.01	38.54	3945.00	4011.00	
TOTAL SHLD REEL	62.66	20.01	4003.00	3927.00	
TOTAL SHOULDER	146.92	80.25	3951.00	3910.00	
TOTAL SHD / WT	1.01	0.55	3951.00	3910.00	
LF LAP BELT	47.80	8.08	4014.00	3927.00	8
RT LAP BELT	58.54	19.96	4018.00	3932.00	9
TOTAL LAP	105.17	29.39	4017.00	3925.00	
TOTAL LAP / WT	0.73	0.20	4017.00	3925.00	
CROTCH STRAP	29.99	-38.03	4019.00	3924.00	10
LF SEAT LNK X	61.50	-120.97	4022.00	3924.00	18
RT SEAT LNK X	58.32	-53.64	3977.00	3921.00	19
TOTAL SEAT X	87.02	-173.46	3988.00	3923.00	
SEAT LNK Y	70.14	-7.81	3979.00	3917.00	35
LF SEAT PAN Z	267.24	12.10	3923.00	3651.00	11
RT SEAT PAN Z	326.52	20.86	3926.00	3601.00	12
CT SEAT PAN Z	850.89	85.98	3926.00	3603.00	13
TOTAL SEAT Z	1530.01	132.69	3925.00	3601.00	
TOTAL SEAT Z / WT	10.55	0.92	3925.00	3601.00	
RES SEAT FORCE	1539.00	138.28	3925.00	3601.00	
RES SEAT FORCE / WT	10.61	0.95	3925.00	3601.00	
LF FOOT X	1.75	-171.84	3878.00	3925.00	20
RT FOOT X	10.03	-133.60	3875.00	3927.00	23
CT FOOT X	23.58	-203.60	3876.00	3925.00	26
TOTAL FOOT X	32.72	-499.35	3876.00	3925.00	
LF FOOT Y	141.66	-19.93	3920.00	3885.00	21
RT FOOT Y	23.20	-129.44	3749.00	3927.00	24
CT FOOT Y	38.48	-53.18	3876.00	3928.00	27
TOTAL FOOT Y	47.62	-72.40	3875.00	3928.00	
LF FOOT Z	184.21	-4.79	3919.00	4038.00	22
RT FOOT Z	216.77	-24.79	3935.00	3877.00	25
CT FOOT Z	157.49	-98.90	3941.00	3887.00	28
TOTAL FOOT Z	471.45	-53.14	3935.00	3887.00	
RES FOOT FORCE	645.12	36.40	3935.00	4004.00	

HEAD REST POS STUDY TEST: 386 SUBJ: R-1 WT: 198.0 G: 10 GP: 2 CELL: B

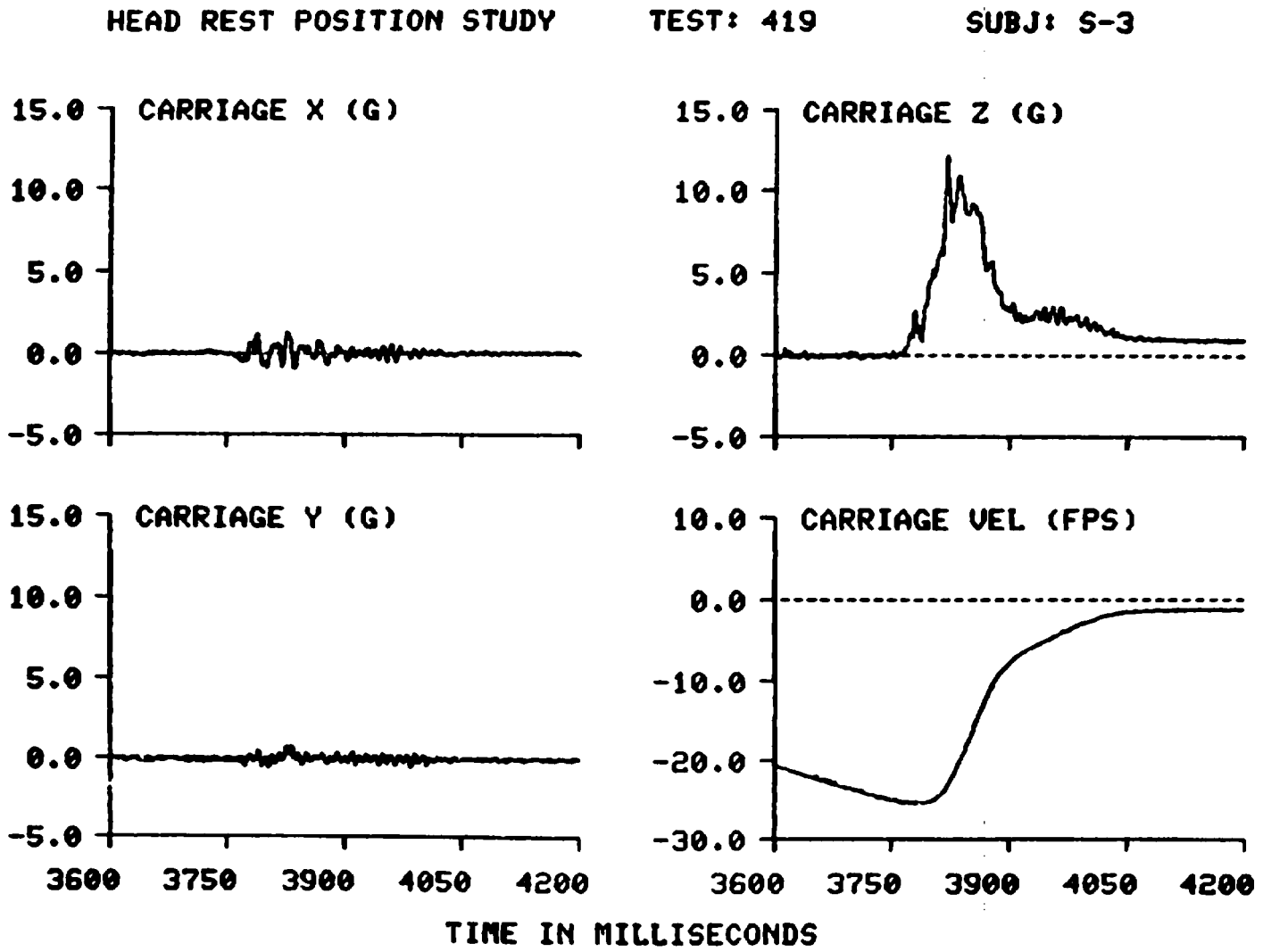
DATA ID	MAX	MIN	T1	T2	CH
IDV EXT PWR	10.05	9.97	1097.00	842.00	48
CARRIAGE X	1.59	-1.26	3830.00	3841.00	36
CARRIAGE Y	0.10	-1.57	3865.00	3814.00	31
CARRIAGE Z	12.03	-0.27	3859.00	3680.00	1
CARRIAGE Z (SM)	10.30	-0.10	3874.00	3656.00	
CARRIAGE VEL	-0.95	-25.85	4187.00	3825.00	29
SEAT X	1.90	-1.57	3832.00	3839.00	32
SEAT Y	0.92	-1.22	3828.00	3838.00	33
SEAT Z	11.18	-0.26	3858.00	3667.00	34
SEAT Z (SM)	10.12	-0.15	3867.00	3641.00	
CHEST X	7.58	-0.66	3891.00	3628.00	5
CHEST Y	0.33	-2.17	3877.00	3895.00	6
CHEST Z	18.28	-1.58	3893.00	3747.00	7
CHEST RES	19.73	0.94	3893.00	4164.00	
CHEST SI	94.10		3825.00	3953.00	
HEAD X	2.35	-3.85	3874.00	3920.00	2
HEAD Y	1.31	-1.26	3969.00	3881.00	3
HEAD Z	11.49	-0.93	3884.00	3747.00	4
HEAD RES	11.74	0.54	3884.00	4145.00	
HEAD SI	19.49		3835.00	4063.00	
HEAD HIC	16.11		3856.00	3929.00	
SHD REFL LF	72.93	21.77	3911.00	4100.00	14
SHD REEL LF	80.71	12.85	3910.00	3871.00	16
LF SHOULDER	133.31	63.08	3910.00	3869.00	
SHD REFL RT	59.59	36.48	3905.00	3985.00	15
SHD REEL RT	71.81	12.33	3970.00	3871.00	17
RT SHOULDER	127.95	50.53	3906.00	3869.00	
TOTAL SHLD REFL	192.02	88.14	3911.00	3986.00	
TOTAL SHLD REEL	127.97	25.18	3908.00	3871.00	
TOTAL SHOULDER	258.24	113.61	3909.00	3869.00	
TOTAL SHD / WT	1.30	0.57	3909.00	3869.00	
LF LAP BELT	46.86	23.77	3915.00	3859.00	8
RT LAP BELT	73.88	42.98	3922.00	3859.00	9
TOTAL LAP	119.43	66.15	3915.00	3859.00	
TOTAL LAP / WT	0.60	0.33	3915.00	3859.00	
CROTCH STRAP	246.46	-82.83	3970.00	3888.00	10
LF SEAT LNK X	33.17	-147.57	3962.00	3875.00	18
RT SEAT LNK X	18.80	-138.31	3833.00	3878.00	19
TOTAL SEAT X	17.61	-285.26	4112.00	3875.00	
SEAT LNK Y	46.49	-52.78	3958.00	3884.00	35
LF SEAT PAN Z	449.77	48.87	3878.00	3672.00	11
RT SEAT PAN Z	690.91	66.62	3876.00	3606.00	12
CT SEAT PAN Z	762.16	55.63	3879.00	3600.00	13
TOTAL SEAT Z	1897.87	184.69	3878.00	3604.00	
TOTAL SEAT Z / WT	9.59	0.93	3878.00	3604.00	
RES SEAT FORCE	1917.98	185.98	3878.00	3604.00	
RES SEAT FORCE / WT	9.69	0.94	3878.00	3604.00	
LF FOOT X	-52.51	-297.86	3827.00	3874.00	20
RT FOOT X	-20.50	-203.78	3830.00	3877.00	23
CT FOOT X	-67.42	-306.23	3830.00	3876.00	26
TOTAL FOOT X	-144.95	-741.65	3830.00	3876.00	
LF FOOT Y	187.04	-21.71	3870.00	4094.00	21
RT FOOT Y	24.89	-182.97	4007.00	3878.00	24
CT FOOT Y	92.48	-56.51	3853.00	3882.00	27
TOTAL FOOT Y	72.30	-77.04	3853.00	3881.00	
LF FOOT Z	295.53	58.20	3879.00	3821.00	22
RT FOOT Z	286.33	52.97	3877.00	4125.00	25
CT FOOT Z	148.58	-189.89	3883.00	3842.00	28
TOTAL FOOT Z	632.02	-14.84	3879.00	3821.00	
RES FOOT FORCE	942.13	243.51	3879.00	4114.00	

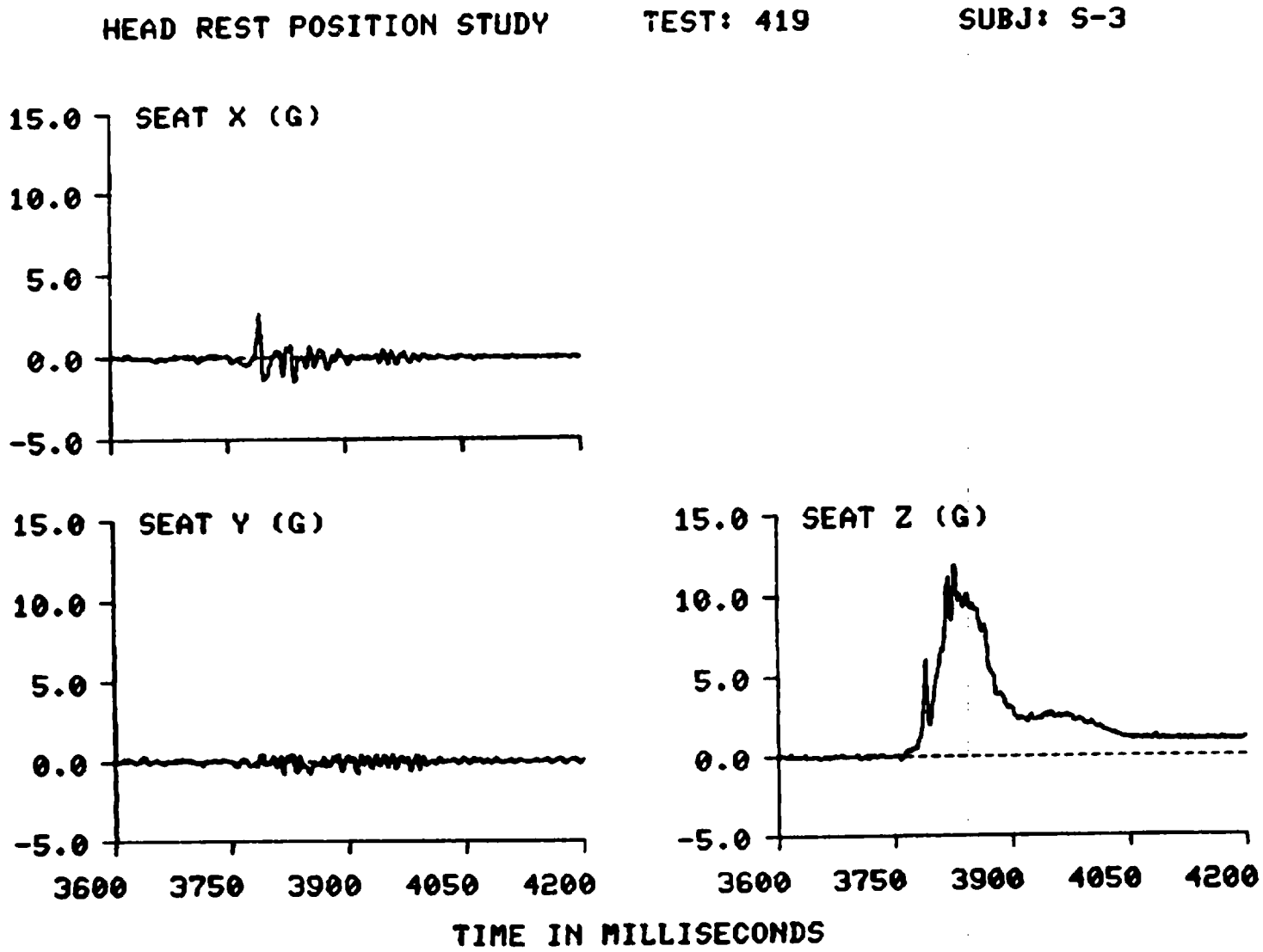
HEAD REST POS STUDY TEST: 440 SUBJ: R-3 WT: 147.0 G: 10 GP: 2 CELL: 8

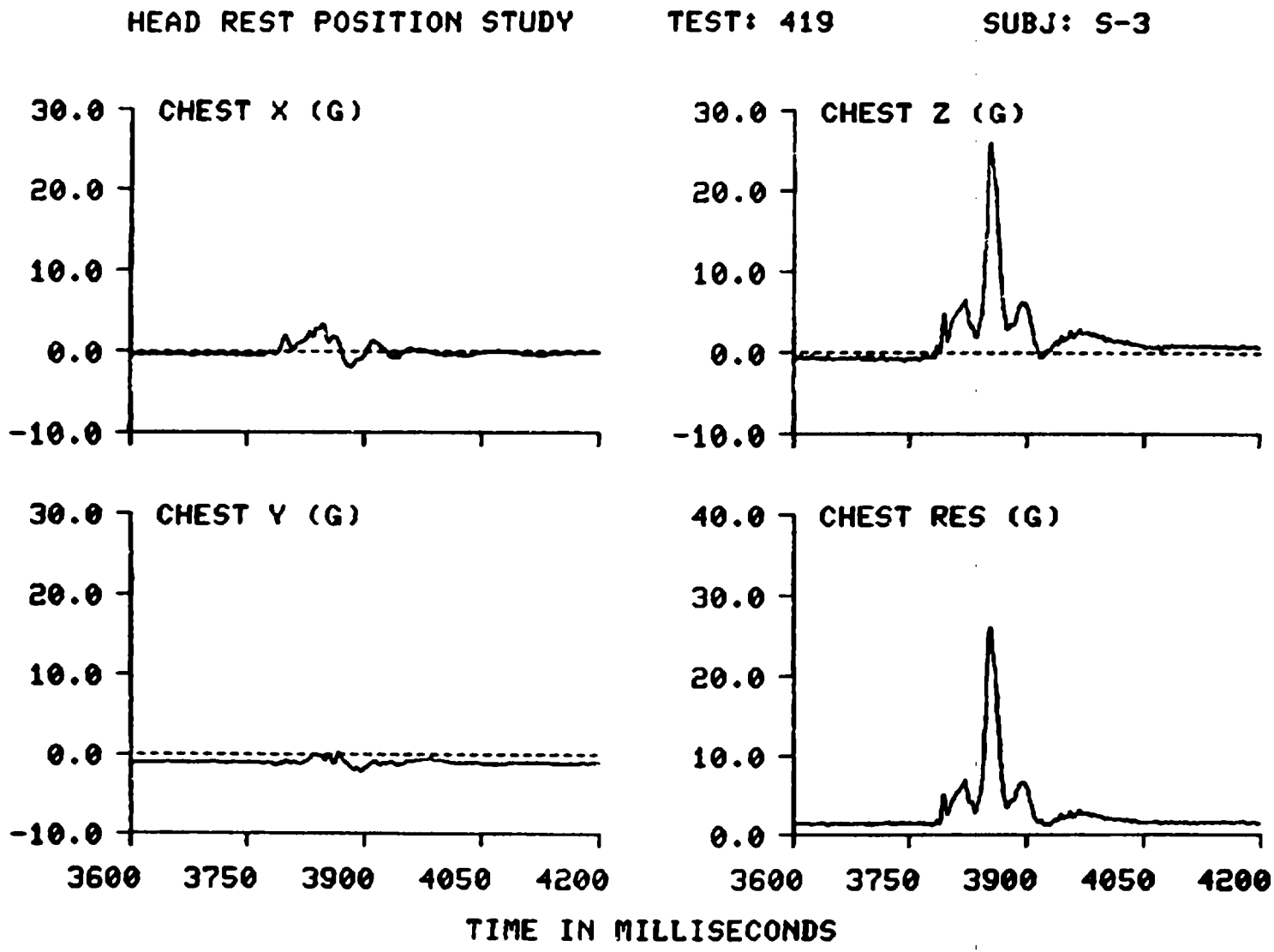
DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.98	634.00	600.00	48
CARRIAGE X	1.60	-0.68	3885.00	3838.00	30
CARRIAGE Y	0.62	-0.69	3863.00	3841.00	31
CARRIAGE Z	12.04	-0.30	3858.00	3669.00	1
CARRIAGE Z (SM)	10.55	-0.15	3858.00	3668.00	
CARRIAGE VEL	-0.96	-25.95	4114.00	3816.00	29
SEAT X	1.18	-1.20	3866.00	3871.00	32
SEAT Y	1.18	-1.35	3824.00	3831.00	33
SEAT Z	12.15	-0.15	3864.00	3677.00	34
SEAT Z (SM)	10.80	-0.10	3864.00	3739.00	
CHEST X	4.98	-0.67	3879.00	3916.00	5
CHEST Y	-0.42	-3.50	3873.00	3880.00	6
CHEST Z	18.00	-1.85	3893.00	3957.00	7
CHEST RES	16.69	1.56	3893.00	4198.00	
CHEST SI	27.82		3825.00	3951.00	
HEAD X	1.19	-3.05	3977.00	3919.00	2
HEAD Y	2.09	0.55	4035.00	3890.00	3
HEAD Z	19.71	-1.18	3878.00	3722.00	4
HEAD RES	19.76	1.24	3878.00	4085.00	
HEAD SI	19.97		3833.00	3948.00	
HEAD HIC	15.23		3856.00	3905.00	
SHD REFL LF	38.72	7.91	3907.00	4087.00	14
SHD REEL LF	18.18	5.24	4063.00	3863.00	16
LF SHOULDER	54.55	15.71	3910.00	3956.00	
SHD REFL RT	39.07	12.46	3879.00	3952.00	15
SHD REEL RT	20.23	2.31	3966.00	3869.00	17
RT SHOULDER	48.42	25.92	3903.00	4049.00	
TOTAL SHLD REFL	79.08	23.05	3863.00	3954.00	
TOTAL SHLD REEL	37.31	8.84	3925.00	3864.00	
TOTAL SHOULDER	98.22	50.25	3910.00	3956.00	
TOTAL SHD / WT	0.67	0.34	3910.00	3956.00	
LF LAP BELT	44.99	11.04	3971.00	3880.00	8
RT LAP BELT	69.94	16.69	3967.00	3870.00	9
TOTAL LAP	107.05	29.44	3969.00	3869.00	
TOTAL LAP / WT	0.73	0.20	3969.00	3869.00	
CROTCH STRAP	37.98	-57.37	3968.00	3875.00	10
LF SEAT LNK X	40.18	-172.22	3967.00	3872.00	18
RT SEAT LNK X	11.44	-84.84	3829.00	3877.00	19
TOTAL SEAT X	40.80	-235.62	4194.00	3872.00	
SEAT LNK Y	58.71	-88.37	3941.00	3876.00	35
LF SEAT PAN Z	470.65	38.98	3878.00	3636.00	11
RT SEAT PAN Z	383.88	35.48	3879.00	3602.00	12
CT SEAT PAN Z	723.74	58.48	3883.00	3605.00	13
TOTAL SEAT Z	1572.24	142.51	3878.00	3615.00	
TOTAL SEAT Z / WT	10.70	0.97	3878.00	3615.00	
RES SEAT FORCE	1591.42	143.74	3878.00	3615.00	
RES SEAT FORCE / WT	10.83	0.98	3878.00	3615.00	
LF FOOT X	5.78	-119.58	3826.00	3871.00	20
RT FOOT X	8.41	-82.35	3805.00	3875.00	23
CT FOOT X	59.80	-139.65	3826.00	3876.00	26
TOTAL FOOT X	66.83	-324.75	3825.00	3875.00	
LF FOOT Y	141.00	-15.36	3860.00	3833.00	21
RT FOOT Y	24.05	-134.80	4156.00	3860.00	24
CT FOOT Y	21.84	-38.68	3823.00	3879.00	27
TOTAL FOOT Y	87.62	-73.24	3845.00	3876.00	
LF FOOT Z	187.87	-9.31	3860.00	3719.00	22
RT FOOT Z	186.71	-11.55	3884.00	3882.00	25
CT FOOT Z	172.80	-61.58	3866.00	3699.00	28
TOTAL FOOT Z	455.63	-31.82	3861.00	3834.00	
RES FOOT FORCE	548.79	16.29	3884.00	3872.00	

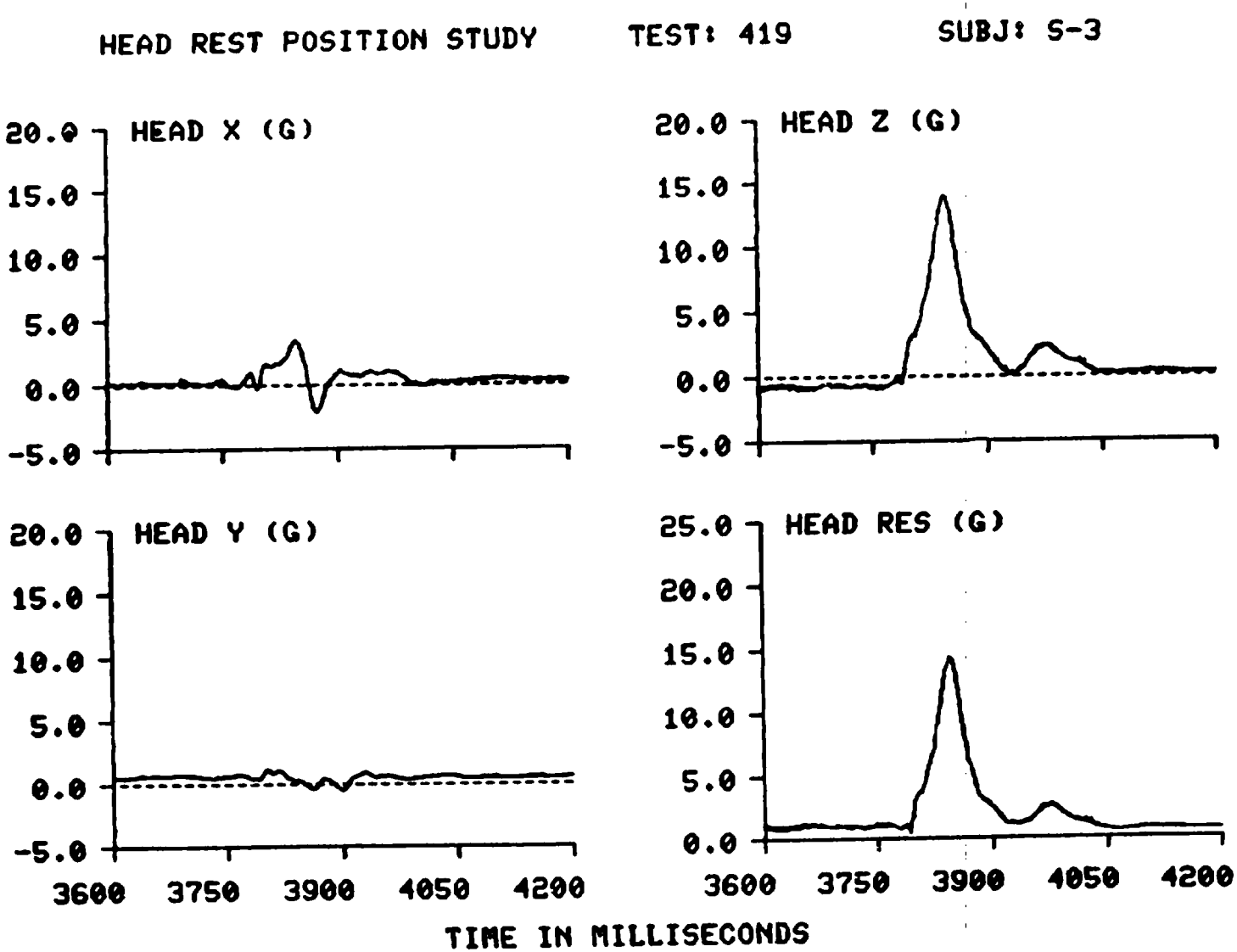
HEAD REST POS STUDY TEST: 419 SUBJ: S-3 WT: 166.0 G: 10 GP: 2 CELL: B

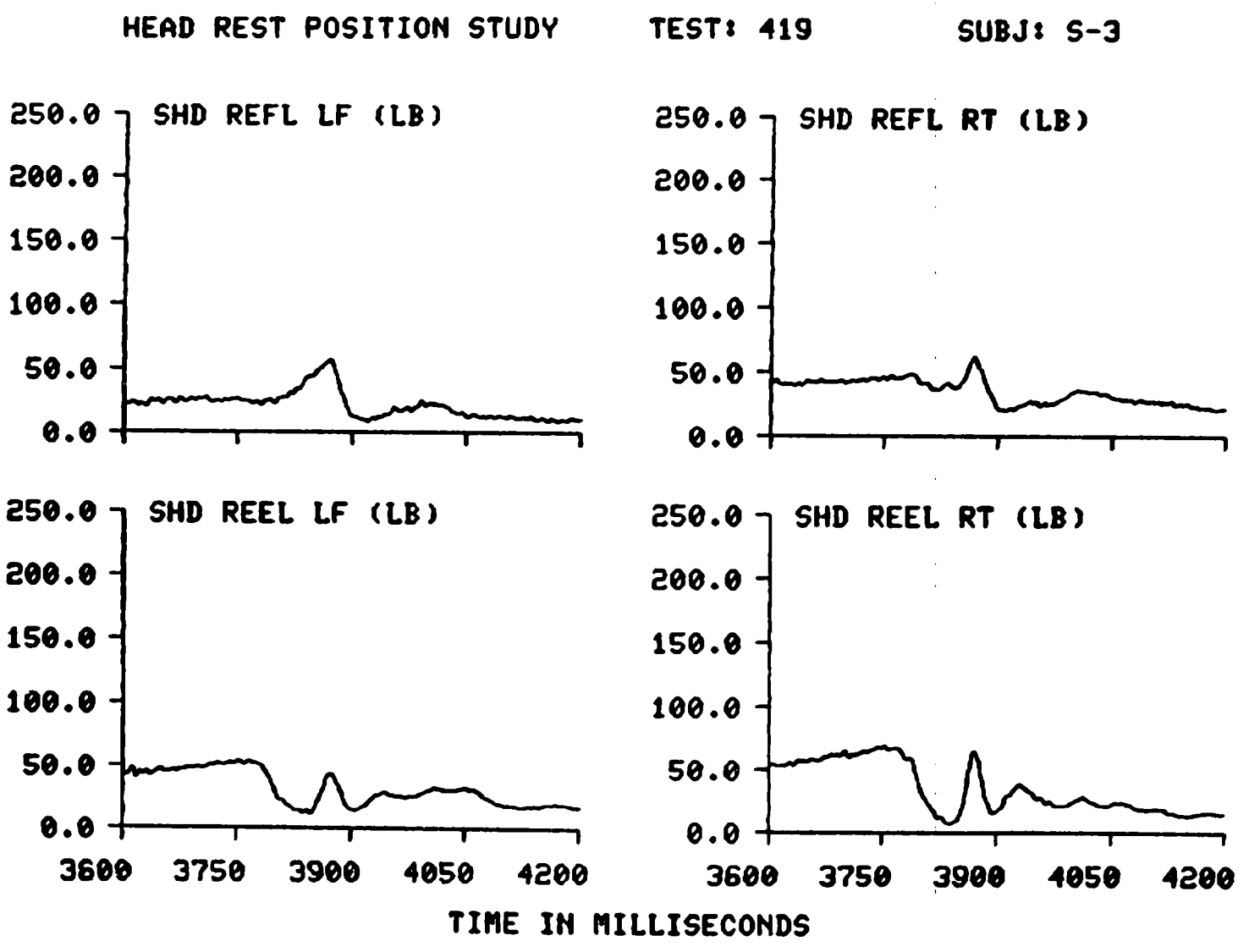
DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.04	9.96	139.00	3182.00	48
CARRIAGE X	1.29	-0.95	3827.00	3836.00	36
CARRIAGE Y	0.78	-0.63	3833.00	3803.00	31
CARRIAGE Z	12.18	-0.26	3821.00	3710.00	1
CARRIAGE Z (SM)	10.40	-0.10	3821.00	3630.00	
CARRIAGE VEL	-1.06	-25.52	4162.00	3780.00	29
SEAT X	2.67	-1.55	3790.00	3835.00	32
SEAT Y	0.51	-0.82	3788.00	3849.00	33
SEAT Z	11.84	-0.22	3827.00	3758.00	34
SEAT Z (SM)	10.64	-0.13	3828.00	3654.00	
CHEST X	3.38	-1.93	3846.00	3882.00	5
CHEST Y	0.24	-2.17	3867.00	3896.00	6
CHEST Z	28.01	-0.99	3852.00	3742.00	7
CHEST RES	26.04	1.18	3852.00	3700.00	
CHEST SI	45.04		3789.00	3913.00	
HEAD X	3.47	-2.07	3845.00	3872.00	2
HEAD Y	1.14	-0.50	3802.00	3899.00	3
HEAD Z	13.90	-1.00	3844.00	3603.00	4
HEAD RES	14.30	0.45	3844.00	3791.00	
HEAD SI	22.28		3795.00	3916.00	
HEAD HIC	18.13		3818.00	3871.00	
SHD REFL LF	56.61	9.08	3870.00	3920.00	14
SHD REEL LF	42.93	11.15	3874.00	3846.00	16
LF SHOULDER	98.97	25.74	3871.00	3904.00	
SHD REFL RT	61.93	20.54	3868.00	3910.00	15
SHD REEL RT	64.21	6.33	3871.00	3839.00	17
RT SHOULDER	124.78	38.00	3870.00	3900.00	
TOTAL SHLD REFL	118.11	30.41	3869.00	3920.00	
TOTAL SHLD REEL	106.66	18.72	3871.00	3837.00	
TOTAL SHOULDER	223.37	64.72	3870.00	3902.00	
TOTAL SHD / WT	1.35	0.39	3870.00	3902.00	
LF LAP BELT	43.67	14.22	3927.00	3853.00	8
RT LAP BELT	53.16	23.59	3931.00	3831.00	9
TOTAL LAP	95.97	38.01	3929.00	3853.00	
TOTAL LAP / WT	0.58	0.23	3929.00	3853.00	
CROTCH STRAP	116.46	-50.40	3939.00	3839.00	10
LF SEAT LNK X	24.35	-213.95	3807.00	3837.00	18
RT SEAT LNK X	28.28	-101.78	3791.00	3835.00	19
TOTAL SEAT X	25.25	-315.15	3807.00	3836.00	
SEAT LNK Y	65.34	-108.70	3938.00	3844.00	35
LF SEAT PAN Z	581.23	61.70	3845.00	3603.00	11
RT SEAT PAN Z	505.18	46.32	3846.00	4200.00	12
CT SEAT PAN Z	684.12	49.08	3849.00	3808.00	13
TOTAL SEAT Z	1753.38	164.11	3846.00	3604.00	
TOTAL SEAT Z / WT	10.56	0.99	3846.00	3604.00	
RES SEAT FORCE	1780.42	166.56	3846.00	3604.00	
RES SEAT FORCE / WT	10.73	1.00	3846.00	3604.00	
LF FOOT X	4.43	-157.41	3788.00	3847.00	20
RT FOOT X	14.45	-142.40	3787.00	3847.00	23
CT FOOT X	85.10	-203.71	3788.00	3848.00	26
TOTAL FOOT X	48.69	-499.05	3788.00	3847.00	
LF FOOT Y	124.00	-28.24	3823.00	3796.00	21
RT FOOT Y	21.80	-142.38	3731.00	3847.00	24
CT FOOT Y	92.54	-53.79	3643.00	3832.00	27
TOTAL FOOT Y	64.50	-64.46	3862.00	3832.00	
LF FOOT Z	201.13	-18.22	3847.00	3965.00	22
RT FOOT Z	258.06	-5.15	3848.00	3951.00	25
CT FOOT Z	170.85	-69.59	3845.00	3779.00	28
TOTAL FOOT Z	558.45	-45.58	3846.00	3779.00	
RES FOOT FORCE	741.44	42.15	3847.00	3950.00	

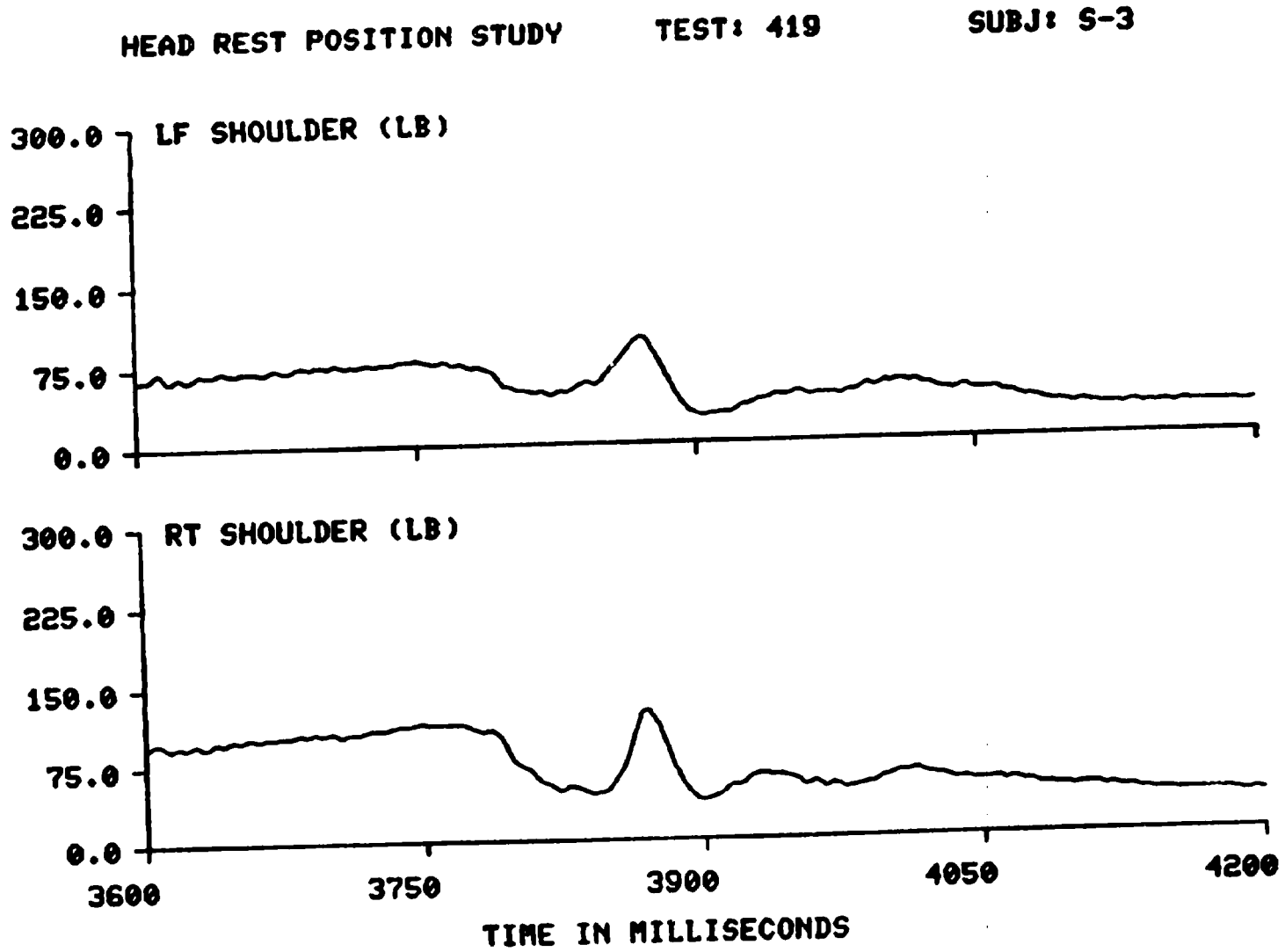

HEAD REST POSITION STUDY
TEST: 419
SUBJ: S-3
CARRIAGE X (G)
15.0
10.0
5.0
0.0
-5.0
CARRIAGE Z (G)
15.0
10.0
5.0
0.0
-5.0
CARRIAGE Y (G)
15.0
10.0
5.0
0.0
-5.0
CARRIAGE VEL (FPS)
10.0
0.0
-10.0
-20.0
-30.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

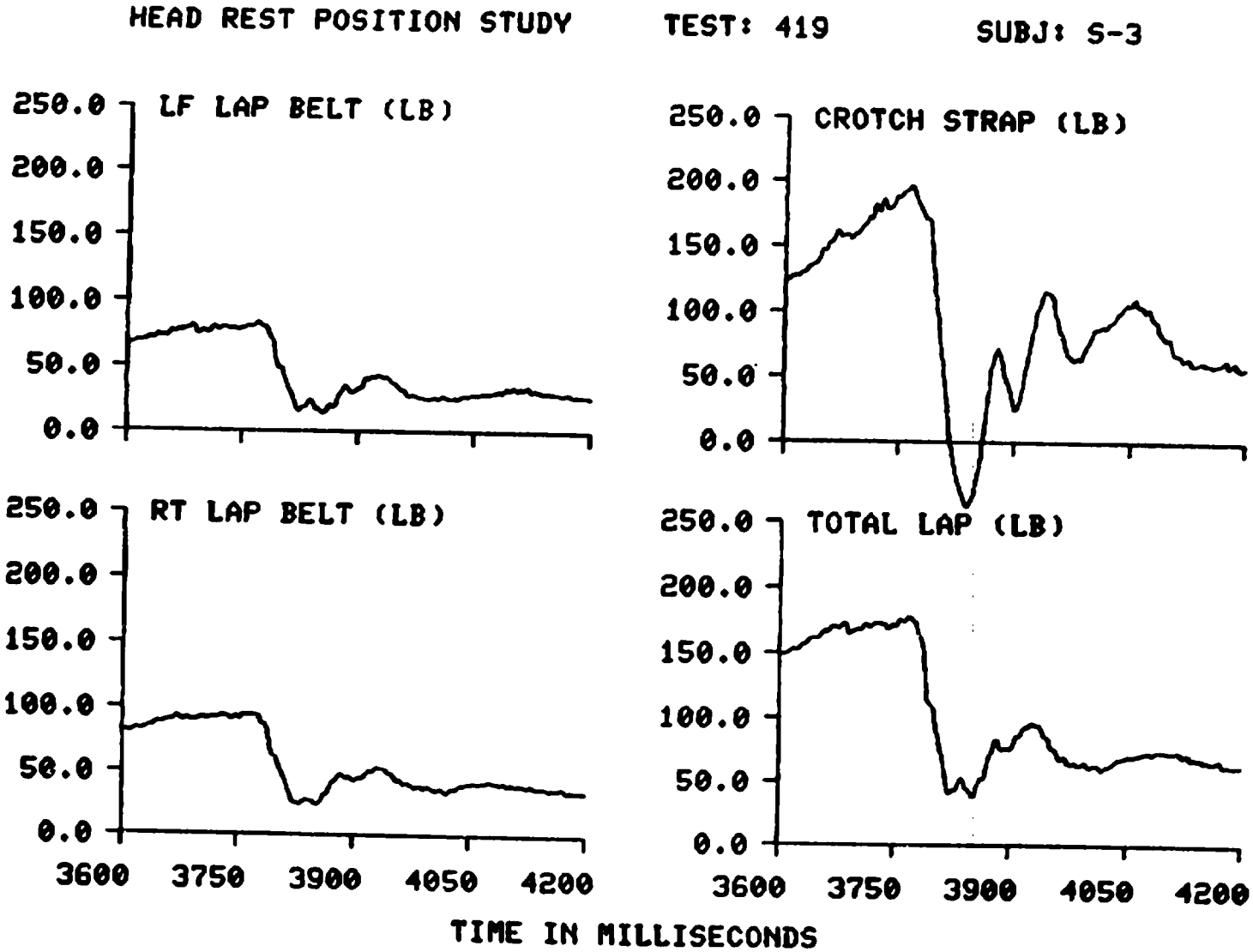

HEAD REST POSITION STUDY
TEST: 419
SUBJ: S-3
SEAT X (G)
15.0
10.0
5.0
0.0
-5.0
SEAT Y (G)
SEAT Z (G)
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

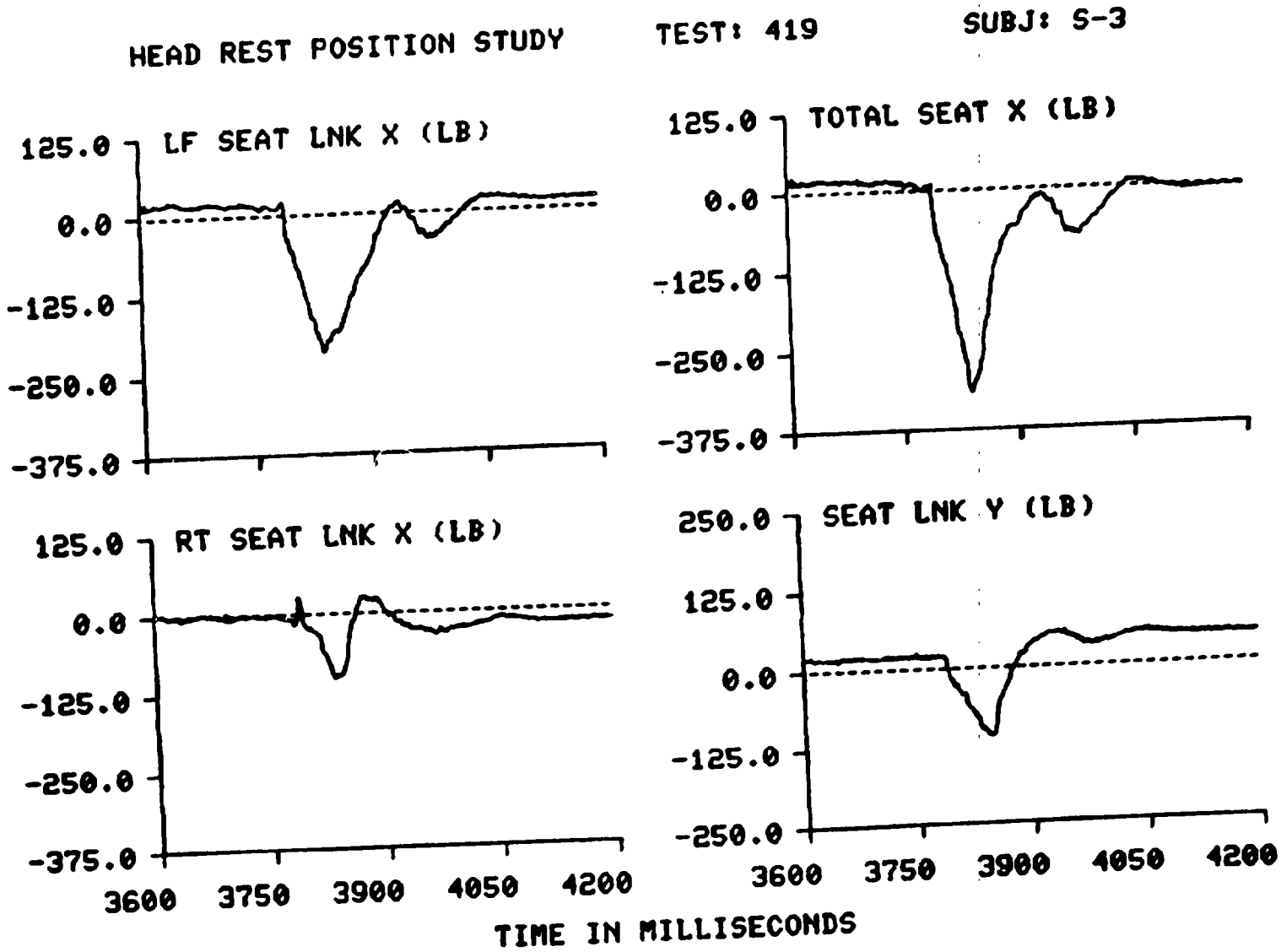

HEAD REST POSITION STUDY
TEST: 419
SUBJ: S-3
CHEST X (G)
CHEST Z (G)
CHEST Y (G)
CHEST RES (G)
30.0
20.0
10.0
0.0
-10.0
40.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

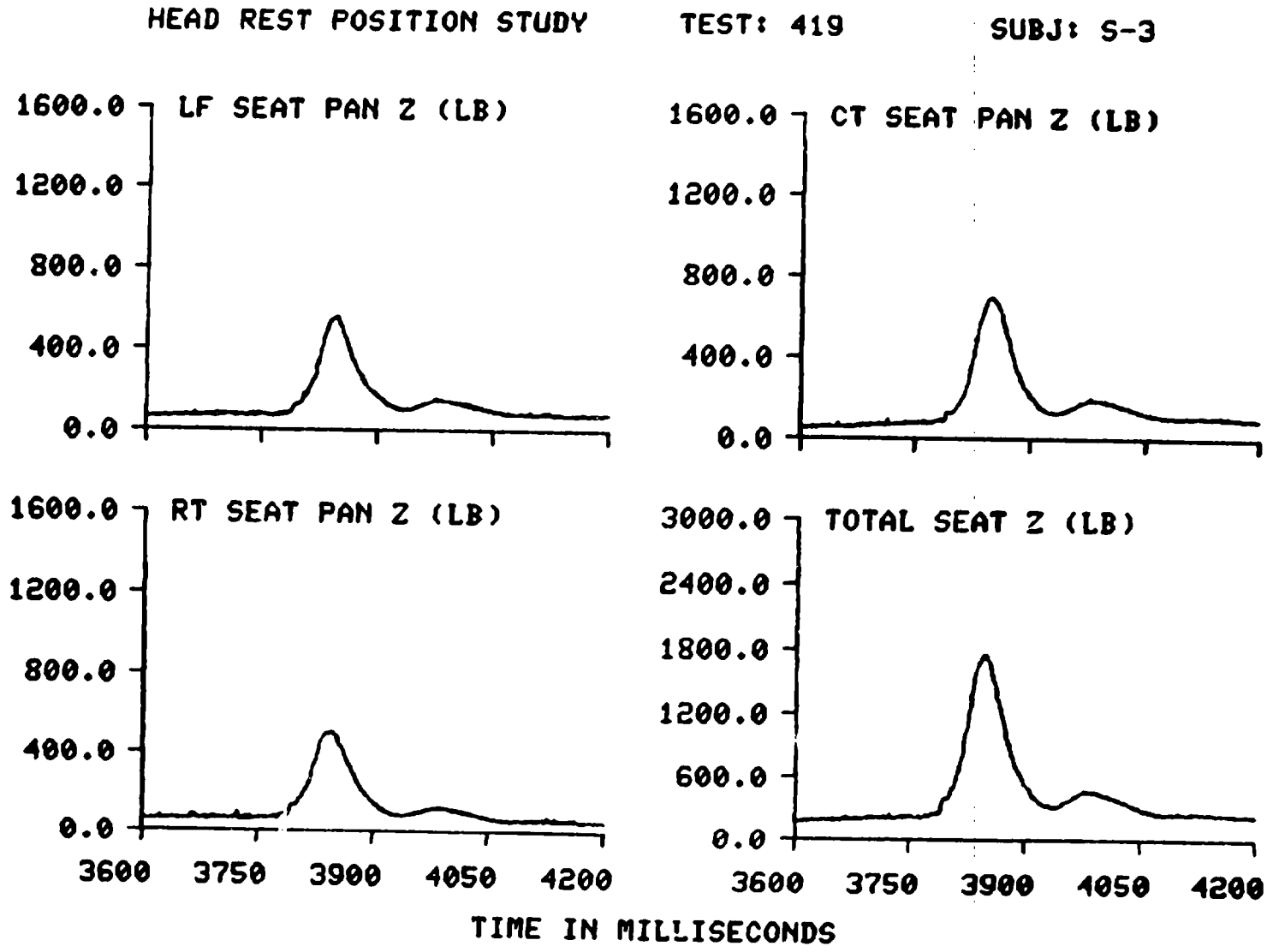

HEAD REST POSITION STUDY
TEST: 419
SUBJ: S-3
HEAD X (G)
HEAD Z (G)
HEAD Y (G)
HEAD RES (G)
20.0
15.0
10.0
5.0
0.0
-5.0
25.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

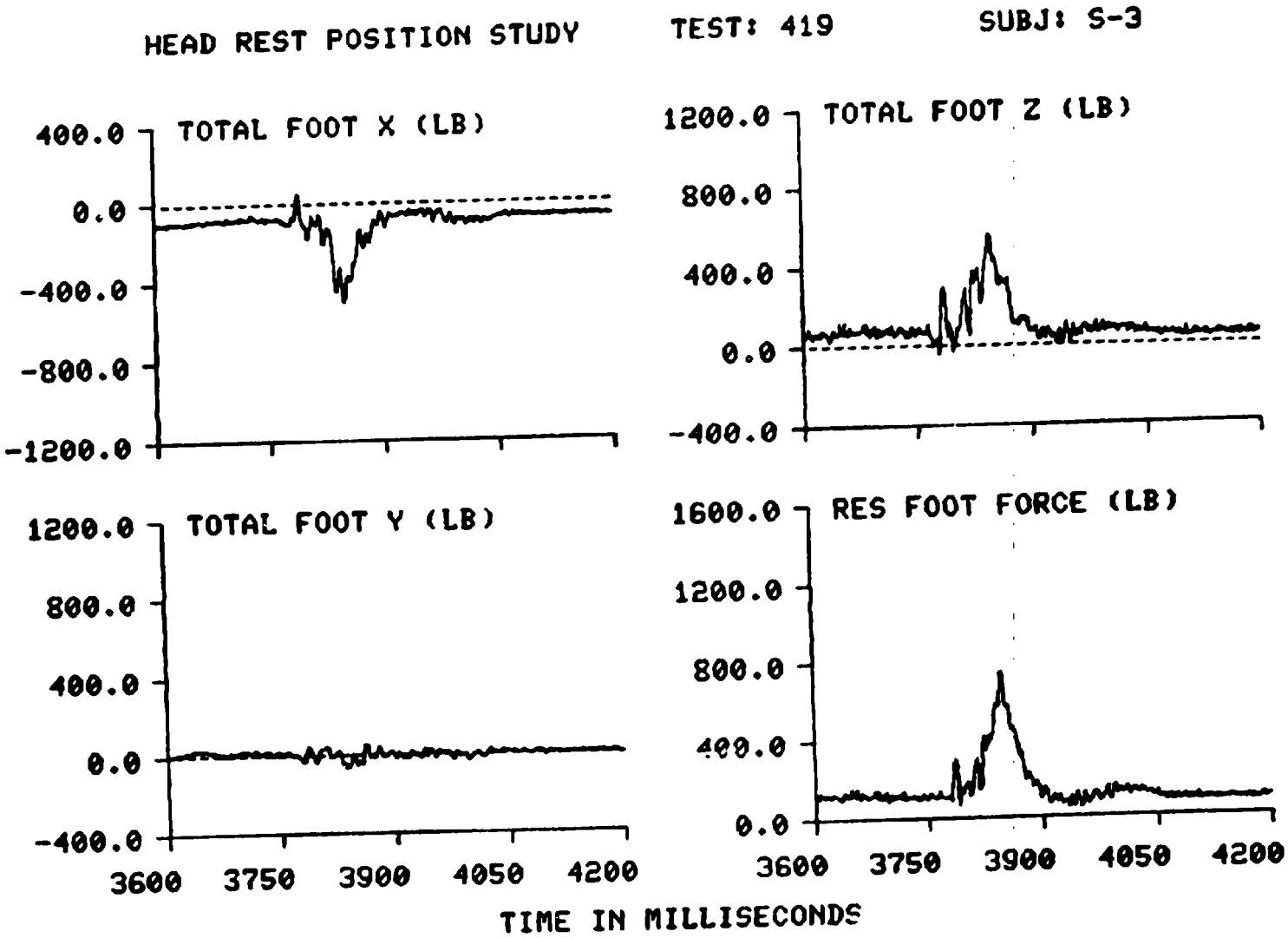

HEAD REST POSITION STUDY
TEST: 419
SUBJ: S-3
SHD REFL LF (LB)
SHD REFL RT (LB)
SHD REEL LF (LB)
SHD REEL RT (LB)
250.0
200.0
150.0
100.0
50.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 419
SUBJ: S-3
LF SHOULDER (LB)
300.0
225.0
150.0
75.0
0.0
RT SHOULDER (LB)
300.0
225.0
150.0
75.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 419
SUBJ: S-3
LF LAP BELT (LB)
CROTCH STRAP (LB)
RT LAP BELT (LB)
TOTAL LAP (LB)
250.0
200.0
150.0
100.0
50.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 419
SUBJ: S-3
LF SEAT LNK X (LB)
TOTAL SEAT X (LB)
RT SEAT LNK X (LB)
SEAT LNK Y (LB)
125.0
0.0
-125.0
-250.0
-375.0
250.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 419
SUBJ: S-3
LF SEAT PAN Z (LB)
1600.0
1200.0
800.0
400.0
0.0
CT SEAT PAN Z (LB)
1600.0
1200.0
800.0
400.0
0.0
RT SEAT PAN Z (LB)
1600.0
1200.0
800.0
400.0
0.0
TOTAL SEAT Z (LB)
3000.0
2400.0
1800.0
1200.0
600.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 419
SUBJ: S-3
TOTAL FOOT X (LB)
400.0
0.0
-400.0
-800.0
-1200.0
TOTAL FOOT Z (LB)
1200.0
800.0
400.0
0.0
-400.0
TOTAL FOOT Y (LB)
1200.0
800.0
400.0
0.0
-400.0
RES FOOT FORCE (LB)
1600.0
1200.0
800.0
400.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

HEAD REST POS STUDY TEST: 360 SUBJ: 5-1 WT: 210.0 G: 10 GP: 1 CELL: C

DATA ID	MAX	MIN	T1	T2	CM
10V EXT PWR	10.05	9.97	2258.00	435.00	48
CARRIAGE X	1.34	-0.91	3865.00	3830.00	36
CARRIAGE Y	0.74	-1.00	3865.00	3809.00	31
CARRIAGE Z	12.06	-0.24	3858.00	3861.00	1
CARRIAGE Z (SM)	10.51	-0.08	3858.00	3854.00	
CARRIAGE VEL	-1.11	-25.82	4163.00	3832.00	29
SEAT X	1.93	-1.34	3823.00	3829.00	32
SEAT Y	0.81	-0.99	3966.00	3844.00	53
SEAT Z	11.57	-0.26	3863.00	3630.00	34
SEAT Z (SM)	10.58	-0.16	3864.00	3687.00	
CHEST X	5.23	-1.60	3878.00	3910.00	5
CHEST Y	-0.28	-3.22	3856.00	3897.00	6
CHEST Z	16.73	-1.27	3895.00	3638.00	7
CHEST RES	17.17	0.77	3893.00	4141.00	
CHEST SI	27.57		3827.00	3959.00	
HEAD X	.09	-4.62	3733.00	3908.00	2
HEAD Y	2.08	0.28	3888.00	3980.00	3
HEAD Z	13.74	-1.32	3876.00	3698.00	4
HEAD RES	14.02	0.67	3876.00	3988.00	
HEAD SI	21.47		3831.00	3964.00	
HEAD HIC	16.33		3850.00	3921.00	
SHD REFL LF	59.61	23.19	3884.00	3973.00	14
SHD REEL LF	56.03	9.25	3931.00	3872.00	18
LF SHOULDER	97.16	55.39	3907.00	3983.00	
SHD REFL RT	54.51	16.10	3902.00	4100.00	15
SHD REEL RT	41.06	2.93	3909.00	3860.00	17
RT SHOULDER	92.79	37.11	3907.00	3860.00	
TOTAL SHLD REFL	105.38	46.37	3898.00	3974.00	
TOTAL SHLD REEL	95.09	13.03	3909.00	3869.00	
TOTAL SHOULDER	169.95	93.74	3907.00	3860.00	
TOTAL SHD / WT	0.90	0.45	3907.00	3860.00	
LF LAP BELT	56.81	32.18	3970.00	3858.00	8
RT LAP BELT	43.31	27.65	4052.00	3859.00	9
TOTAL LAP	95.53	59.92	3970.00	3858.00	
TOTAL LAP / WT	0.45	0.29	3970.00	3858.00	
CROTCH STRAP	283.31	-13.43	3960.00	3880.00	10
LF SEAT LNK X	52.29	-172.19	4095.00	3878.00	18
RT SEAT LNK X	30.01	-94.32	3937.00	3873.00	19
TOTAL SEAT X	69.06	-265.36	3937.00	3873.00	
SEAT LNK Y	78.12	-42.33	3924.00	3876.00	35
LF SEAT PAN Z	587.40	38.59	3876.00	3655.00	11
RT SEAT PAN Z	457.49	35.90	3875.00	3620.00	12
CT SEAT PAN Z	1168.34	91.54	3878.00	3515.00	13
TOTAL SEAT Z	2210.54	173.85	3876.00	3602.00	
TOTAL SEAT Z / WT	10.53	0.83	3876.00	3602.00	
RES SEAT FORCE	2226.09	175.45	3876.00	3602.00	
RES SEAT FORCE / WT	10.60	0.84	3876.00	3602.00	
LF FOOT X	28.44	-154.13	3824.00	3876.00	20
RT FOOT X	11.81	-199.67	3823.00	3876.00	23
CT FOOT X	30.50	-207.42	3825.00	3876.00	26
TOTAL FOOT X	67.21	-571.22	3824.00	3876.00	
LF FOOT Y	156.30	-23.64	3859.00	3832.00	21
RT FOOT Y	26.09	-169.14	3824.00	3868.00	24
CT FOOT Y	19.83	-37.13	3896.00	3835.00	27
TOTAL FOOT Y	46.38	-48.84	3896.00	3833.00	
LF FOOT Z	196.13	-34.90	3869.00	3964.00	22
RT FOOT Z	251.58	0.89	3861.00	3972.00	25
CT FOOT Z	171.56	-77.91	3884.00	3835.00	28
TOTAL FOOT Z	599.02	-37.04	3869.00	3810.00	
RES FOOT FORCE	765.67	40.29	3869.00	3973.00	

HEAD REST POS STUDY TEST: 406 SUBJ: F-3 WT: 166.0 G: 10 GP: 1 CELL: C

DATA ID	MAX	MIN	T1	T2	CH
IOV EXT PWR	10.06	9.96	773.00	2861.00	48
CARRIAGE X	1.60	-0.90	3862.00	3872.00	36
CARRIAGE Y	0.30	-1.04	3904.00	3851.00	31
CARRIAGE Z	12.20	-0.29	3893.00	3792.00	1
CARRIAGE Z (SM)	10.45	-0.12	3908.00	3794.00	
CARRIAGE VEL	-1.00	-25.96	4181.00	3863.00	29
SEAT X	1.82	-1.40	3865.00	3870.00	32
SEAT Y	0.77	-0.97	3900.00	3868.00	33
SEAT Z	11.46	-0.24	3900.00	3677.00	34
SEAT Z (SM)	10.42	-0.15	3901.00	3678.00	
CHEST X	9.03	-1.46	3917.00	3945.00	5
CHEST Y	-0.15	-1.66	3944.00	3929.00	6
CHEST Z	19.12	-1.38	3926.00	3823.00	7
CHEST RES	19.21	0.76	3926.00	3859.00	
CHEST SI	27.58		3861.00	3990.00	
HEAD X	.56	-3.95	3999.00	3941.00	2
HEAD Y	1.49	-0.32	4029.00	3911.00	3
HEAD Z	13.58	-0.98	3915.00	3689.00	4
HEAD RES	13.58	0.80	3915.00	3859.00	
HEAD SI	19.71		3869.00	3988.00	
HEAD HIC	16.52		3889.00	3957.00	
SHD REFL LF	70.99	27.43	3935.00	4007.00	14
SHD REEL LF	48.35	11.38	3942.00	3915.00	18
LF SHOULDER	116.10	48.83	3940.00	4032.00	
SHD REFL RT	64.95	26.83	3932.00	4003.00	15
SHD REEL RT	84.46	17.36	3942.00	3914.00	17
RT SHOULDER	142.94	61.93	3941.00	3908.00	
TOTAL SHLD REFL	134.52	55.25	3934.00	4004.00	
TOTAL SHLD REEL	133.82	28.83	3942.00	3914.00	
TOTAL SHOULDER	259.04	117.64	3941.00	4033.00	
TOTAL SHD / WT	1.56	0.71	3941.00	4033.00	
LF LAP BELT	56.22	16.45	4005.00	3905.00	8
RT LAP BELT	75.69	33.04	4004.00	3907.00	9
TOTAL LAP	131.86	50.00	4004.00	3906.00	
TOTAL LAP / WT	0.79	0.30	4004.00	3906.00	
CROTCH STRAP	89.57	-68.46	3999.00	3914.00	10
LF SEAT LNK X	39.45	-233.96	4003.00	3910.00	18
RT SEAT LNK X	97.04	-68.73	3866.00	3908.00	19
TOTAL SEAT X	44.63	-300.22	3860.00	3910.00	
SEAT LNK Y	69.22	-106.31	3979.00	3915.00	35
LF SEAT PAN Z	473.50	28.70	3918.00	3614.00	11
RT SEAT PAN Z	341.49	25.98	3909.00	3652.00	12
CT SEAT PAN Z	857.01	55.89	3918.00	3610.00	13
TOTAL SEAT Z	1664.52	119.97	3918.00	3601.00	
TOTAL SEAT Z / WT	10.03	0.72	3918.00	3601.00	
RES SEAT FORCE	1690.93	128.09	3918.00	3601.00	
RES SEAT FORCE / WT	10.18	0.77	3918.00	3601.00	
LF FOOT X	8.55	-137.01	3864.00	3908.00	20
RT FOOT X	21.55	-78.90	3861.00	3908.00	23
CT FOOT X	52.52	-147.83	3864.00	3908.00	26
TOTAL FOOT X	71.17	-363.74	3864.00	3908.00	
LF FOOT Y	138.77	-20.07	3896.00	4001.00	21
RT FOOT Y	24.74	-121.66	4192.00	3912.00	24
CT FOOT Y	22.39	-54.14	3868.00	3913.00	27
TOTAL FOOT Y	37.98	-72.71	3885.00	3925.00	
LF FOOT Z	225.56	-7.37	3897.00	3994.00	22
RT FOOT Z	182.12	-6.15	3922.00	3874.00	25
CT FOOT Z	178.41	-107.45	3862.00	3854.00	28
TOTAL FOOT Z	425.90	-109.47	3897.00	3854.00	
RES FOOT FORCE	516.42	55.47	3921.00	4123.00	

HEAD REST POS STUDY TEST: 422 SUBJ: F-2 WT: 161.0 G: 10 GP: 1 CELL: C

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	128.00	167.00	48
CARRIAGE X	1.20	-0.85	3840.00	3809.00	38
CARRIAGE Y	0.56	-0.87	3839.00	3818.00	31
CARRIAGE Z	12.34	-0.15	3833.00	3041.00	1
CARRIAGE Z (SM)	10.52	-0.06	3834.00	3691.00	
CARRIAGE VEL	-0.90	-25.04	4111.00	3799.00	29
SEAT X	1.15	-1.34	3799.00	3848.00	32
SEAT Y	0.84	-1.72	3797.00	3811.00	33
SEAT Z	12.52	-0.22	3840.00	3670.00	34
SEAT Z (SM)	10.66	-0.13	3840.00	3669.00	
CHEST X	3.68	-2.56	3860.00	3866.00	5
CHEST Y	-0.03	-2.04	3820.00	3914.00	6
CHEST Z	22.88	-0.78	3856.00	3673.00	7
CHEST RES	23.17	0.71	3856.00	3791.00	
CHEST SI	98.10		3797.00	3932.00	
HEAD X	1.95	-4.47	3854.00	3687.00	2
HEAD Y	0.78	-1.77	3899.00	3850.00	3
HEAD Z	14.82	-0.78	3854.00	3674.00	4
HEAD RES	14.82	0.56	3854.00	4125.00	
HEAD SI	23.25		3805.00	3954.00	
HEAD HIC	18.36		3833.00	3894.00	
SHD REFL LF	44.59	14.82	3869.00	3945.00	14
SHD REEL LF	82.49	6.41	3888.00	3847.00	16
LF SHOULDER	98.11	26.04	3887.00	3975.00	
SHD REFL RT	64.46	24.93	3873.00	4097.00	15
SHD REEL RT	95.08	9.86	3880.00	3852.00	17
RT SHOULDER	156.48	42.43	3880.00	3846.00	
TOTAL SHLD REFL	107.94	40.94	3871.00	4100.00	
TOTAL SHLD REEL	141.31	16.84	3883.00	3846.00	
TOTAL SHOULDER	240.70	72.54	3881.00	3846.00	
TOTAL SHD / WT	1.50	0.45	3881.00	3846.00	
LF LAP BELT	30.96	7.11	3956.00	3840.00	8
RT LAP BELT	34.80	14.43	3942.00	3843.00	9
TOTAL LAP	62.81	22.38	3947.00	3834.00	
TOTAL LAP / WT	0.39	0.14	3947.00	3834.00	
CROTCH STRAP	156.17	-23.13	3892.00	3851.00	10
LF SEAT LNK X	20.27	-268.10	4177.00	3852.00	18
RT SEAT LNK X	8.62	-130.55	3880.00	3855.00	19
TOTAL SEAT X	11.90	-395.60	3626.00	3853.00	
SEAT LNK Y	54.61	-112.45	3936.00	3852.00	35
LF SEAT PAN Z	504.76	17.53	3857.00	3608.00	11
RT SEAT PAN Z	407.75	8.48	3852.00	3611.00	12
CT SEAT PAN Z	785.21	28.82	3856.00	3636.00	13
TOTAL SEAT Z	1708.14	85.48	3855.00	3811.00	
TOTAL SEAT Z / WT	10.60	0.41	3855.00	3611.00	
RES SEAT FORCE	1754.69	68.86	3855.00	3611.00	
RES SEAT FORCE / WT	10.80	0.43	3855.00	3611.00	
LF FOOT X	1.14	-100.12	3801.00	3849.00	20
RT FOOT X	-4.71	-150.10	3800.00	3851.00	23
CT FOOT X	-22.86	-182.07	3801.00	3851.00	26
TOTAL FOOT X	-30.83	-425.15	3801.00	3850.00	
LF FOOT Y	120.43	-35.92	3836.00	3808.00	21
RT FOOT Y	23.55	-178.12	4039.00	3844.00	24
CT FOOT Y	66.02	-14.08	3875.00	3993.00	27
TOTAL FOOT Y	84.42	-80.63	3815.00	3845.00	
LF FOOT Z	209.04	6.58	3837.00	3794.00	22
RT FOOT Z	201.53	18.96	3844.00	3952.00	25
CT FOOT Z	169.14	-81.82	3843.00	3864.00	28
TOTAL FOOT Z	537.13	-2.50	3844.00	3793.00	
RES FOOT FORCE	616.31	104.25	3844.00	4188.00	

HEAD REST POS STUDY TEST: 387 SUBJ: G-9 WT: 159.0 G: 10 GP: 2 CELL: C

DATA ID	MAX	MIN	T1	T2	CH
IOV EXT PNR	10.04	9.97	29.00	409.00	48
CARRIAGE X	1.52	-0.88	3841.00	3854.00	36
CARRIAGE Y	0.93	-0.94	3880.00	3979.00	51
CARRIAGE Z	12.92	-0.22	3871.00	3686.00	1
CARRIAGE Z (SM)	10.99	-0.08	3886.00	3796.00	
CARRIAGE VEL	-1.04	-25.85	4191.00	3828.00	29
SEAT X	1.76	-1.29	3842.00	3885.00	32
SEAT Y	1.27	-1.41	3838.00	3844.00	33
SEAT Z	11.59	-0.19	3877.00	3709.00	34
SEAT Z (SM)	10.44	-0.10	3878.00	3707.00	
CHEST X	5.09	-1.93	3895.00	3925.00	5
CHEST Y	-0.40	-3.30	3701.00	3903.00	6
CHEST Z	21.86	-0.91	3905.00	3710.00	7
CHEST RES	22.29	0.69	3904.00	3600.00	
CHEST SI	38.79		3835.00	4083.00	
HEAD X	0.65	-6.27	3698.00	3935.00	2
HEAD Y	1.48	-0.14	3951.00	3920.00	3
HEAD Z	19.02	-1.29	3892.00	3705.00	4
HEAD RES	19.03	0.83	3892.00	4191.00	
HEAD SI	19.41		3845.00	4013.00	
HEAD HIC	14.07		3871.00	3812.00	
SHD REFL LF	68.46	15.39	3918.00	4008.00	14
SHD REEL LF	65.09	2.57	3920.00	3873.00	16
LF SHOULDER	131.24	27.89	3920.00	4007.00	
SHD REFL RT	52.91	22.98	3920.00	3987.00	15
SHD REEL RT	72.27	3.97	3919.00	3874.00	17
RT SHOULDER	125.08	34.13	3920.00	3874.00	
TOTAL SHLD REFL	119.18	42.45	3918.00	3987.00	
TOTAL SHLD REEL	137.25	6.69	3920.00	3873.00	
TOTAL SHOULDER	256.32	65.36	3920.00	3874.00	
TOTAL SHD / WT	1.61	0.41	3920.00	3874.00	
LF LAP BELT	51.56	8.40	3990.00	3881.00	8
RT LAP BELT	54.51	15.17	3986.00	3879.00	9
TOTAL LAP	103.27	23.07	3988.00	3880.00	
TOTAL LAP / WT	0.65	0.15	3988.00	3880.00	
CROTCH STRAP	45.95	-54.45	3933.00	3894.00	10
LF SEAT LNK X	39.06	-193.72	3785.00	3887.00	18
RT SEAT LNK X	15.01	-87.67	3835.00	3893.00	19
TOTAL SEAT X	42.27	-279.54	3778.00	3887.00	
SEAT LNK Y	61.98	-70.60	4089.00	3898.00	35
LF SEAT PAN Z	884.22	56.95	3898.00	3600.00	11
RT SEAT PAN Z	878.57	34.21	3897.00	3608.00	12
CT SEAT PAN Z	476.97	28.18	3898.00	3604.00	13
TOTAL SEAT Z	1641.90	129.65	3898.00	3601.00	
TOTAL SEAT Z / WT	11.58	0.82	3896.00	3601.00	
RES SEAT FORCE	1881.29	133.23	3896.00	3601.00	
RES SEAT FORCE / WT	11.71	0.84	3896.00	3601.00	
LF FOOT X	11.69	-121.28	3844.00	3900.00	20
RT FOOT X	91.70	-93.42	3841.00	3900.00	23
CT FOOT X	54.08	-123.02	3849.00	3900.00	26
TOTAL FOOT X	74.32	-337.72	3842.00	3900.00	
LF FOOT Y	127.82	-20.67	3882.00	3851.00	21
RT FOOT Y	20.28	-104.84	3842.00	3890.00	24
CT FOOT Y	18.65	-75.68	3842.00	3893.00	27
TOTAL FOOT Y	84.09	-77.65	3861.00	3893.00	
LF FOOT Z	199.83	-57.57	3875.00	3833.00	22
RT FOOT Z	170.15	-16.50	3891.00	3859.00	25
CT FOOT Z	154.20	-111.23	3898.00	3852.00	28
TOTAL FOOT Z	370.12	-153.26	3898.00	3852.00	
RES FOOT FORCE	464.89	24.99	3891.00	3865.00	

HEAD REST POS STUDY TEST: 380 SUBJ: G-2 WT: 120.0 G: 10 GP: 2 CELL: C

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.86	2845.00	905.00	48
CARRIAGE X	1.20	-1.02	3856.00	3846.00	36
CARRIAGE T	0.77	-1.00	3859.00	3955.00	31
CARRIAGE Z	12.41	-0.18	3847.00	3783.00	1
CARRIAGE Z (SM)	10.68	-0.10	3847.00	3854.00	
CARRIAGE VEL	-0.91	-25.62	4151.00	3816.00	29
SEAT X	1.36	-1.37	3857.00	3862.00	32
SEAT T	0.71	-0.80	3987.00	3981.00	33
SEAT Z	11.81	-0.27	3859.00	3663.00	34
SEAT Z (SM)	10.81	-0.17	3854.00	3663.00	
CHEST X	9.85	-2.13	3864.00	3910.00	5
CHEST T	0.93	-2.42	3886.00	3879.00	6
CHEST Z	22.74	-0.88	3879.00	3786.00	7
CHEST RES	22.87	0.69	3879.00	3726.00	
CHEST SI	35.13		3813.00	4062.00	
HEAD X	0.54	-5.75	3973.00	3910.00	2
HEAD Y	0.83	-0.87	3920.00	3871.00	3
HEAD Z	12.39	-0.80	3868.00	3821.00	4
HEAD RES	12.42	0.40	3868.00	4129.00	
HEAD SI	18.48		3819.00	3943.00	
HEAD HIC	15.33		3842.00	3921.00	
SHD REFL LF	37.27	13.18	3888.00	3956.00	14
SHD REEL LF	45.28	6.43	3903.00	3848.00	16
LF SHOULDER	78.74	24.44	3904.00	3978.00	
SHD REFL RT	37.95	15.70	3911.00	3983.00	15
SHD REEL RT	53.32	2.81	3904.00	3852.00	17
RT SHOULDER	88.38	19.84	3904.00	3986.00	
TOTAL SHLD REFL	72.40	31.40	3887.00	4089.00	
TOTAL SHLD REEL	98.47	9.92	3904.00	3858.00	
TOTAL SHOULDER	167.12	46.43	3904.00	3979.00	
TOTAL SHD / WT	1.39	0.39	3904.00	3979.00	
LF LAP BELT	25.95	2.28	3926.00	3847.00	8
RT LAP BELT	28.92	6.88	3938.00	3850.00	9
TOTAL LAP	54.69	10.05	3938.00	3847.00	
TOTAL LAP / WT	0.46	0.08	3938.00	3847.00	
CROTCH STRAP	41.98	-27.87	3948.00	3868.00	10
LF SEAT LNK X	41.51	-123.11	3969.00	3862.00	18
RT SEAT LNK X	92.97	-42.48	3819.00	3865.00	19
TOTAL SEAT X	49.04	-183.19	3790.00	3862.00	
SEAT LNK Y	66.70	-25.62	3912.00	3884.00	35
LF SEAT PAN Z	355.95	17.04	3865.00	3867.00	11
RT SEAT PAN Z	380.11	15.26	3865.00	3681.00	12
CT SEAT PAN Z	623.02	36.73	3870.00	3852.00	19
TOTAL SEAT Z	1929.03	82.45	3865.00	3867.00	
TOTAL SEAT Z / WT	11.08	0.89	3865.00	3867.00	
RES SEAT FORCE	1938.79	90.65	3865.00	3867.00	
RES SEAT FORCE / WT	11.18	0.78	3865.00	3867.00	
LF FOOT X	15.91	-98.24	3943.00	3869.00	20
RT FOOT X	7.91	-118.98	3810.00	3866.00	23
CT FOOT X	19.82	-103.22	3811.00	3865.00	26
TOTAL FOOT X	24.23	-246.99	3810.00	3865.00	
LF FOOT Y	65.39	-15.84	3850.00	3931.00	21
RT FOOT Y	17.77	-97.60	3629.00	3858.00	24
CT FOOT Y	50.07	-22.91	3862.00	3960.00	27
TOTAL FOOT Y	84.70	-41.51	4019.00	3915.00	
LF FOOT Z	119.82	-23.65	3874.00	3993.00	22
RT FOOT Z	151.38	-20.92	3859.00	3959.00	25
CT FOOT Z	181.70	-53.52	3855.00	3909.00	28
TOTAL FOOT Z	989.29	-68.76	3857.00	3959.00	
RES FOOT FORCE	995.08	7.68	3857.00	4141.00	

HEAD REST POS STUDY TEST: 371 SUBJ: K-1 WT: 175.0 G: 10 GP: 2 CELL: C

DATA ID	MAX	MIN	T1	T2	CM
LOV EXT PWR	10.06	9.97	13.00	389.00	48
CARRIAGE X	1.26	-0.81	3888.00	3882.00	36
CARRIAGE Y	0.42	-0.94	3888.00	3837.00	31
CARRIAGE Z	12.74	-0.71	3882.00	3802.00	1
CARRIAGE Z (SM)	10.69	-0.20	3882.00	3803.00	
CARRIAGE VEL	-1.10	-25.63	4156.00	3842.00	29
SEAT X	1.01	-1.21	3847.00	3897.00	32
SEAT Y	0.86	-1.15	3859.00	3855.00	33
SEAT Z	11.77	-0.31	3888.00	3711.00	34
SEAT Z (SM)	10.65	-0.17	3889.00	3710.00	
CHEST X	6.35	-1.03	3906.00	3945.00	5
CHEST Y	0.12	-1.75	3881.00	3914.00	6
CHEST Z	18.62	-0.81	3915.00	3712.00	7
CHEST RES	19.23	0.58	3915.00	4006.00	
CHEST SI	37.60		3847.00	3997.00	
HEAD X	0.53	-6.03	3699.00	3937.00	2
HEAD Y	1.65	-1.19	3973.00	3903.00	3
HEAD Z	12.31	-1.45	3904.00	3651.00	4
HEAD RES	12.43	1.07	3904.00	4200.00	
HEAD SI	16.85		3861.00	3987.00	
HEAD HIC	13.07		3880.00	3948.00	
SHD REFL LF	35.36	17.67	3913.00	4014.00	14
SHD REEL LF	93.20	4.58	3980.00	3891.00	16
LF SHOULDER	62.35	29.80	3954.00	3884.00	
SHD REFL RT	44.85	12.08	3913.00	3992.00	15
SHD REEL RT	49.55	4.64	3931.00	3888.00	17
RT SHOULDER	82.29	29.68	3928.00	4002.00	
TOTAL SHLD REFL	80.21	33.83	3913.00	3994.00	
TOTAL SHLD REEL	74.81	9.47	3968.00	3890.00	
TOTAL SHOULDER	137.30	66.64	3931.00	3884.00	
TOTAL SHD / WT	0.78	0.38	3931.00	3884.00	
LF LAP BELT	46.98	29.38	3985.00	4075.00	8
RT LAP BELT	58.09	25.55	3984.00	4050.00	9
TOTAL LAP	102.82	55.46	3985.00	4075.00	
TOTAL LAP / WT	0.59	0.32	3985.00	4075.00	
CROTCH STRAP	117.28	-51.40	3978.00	3898.00	10
LF SEAT LNK X	16.07	-215.32	3734.00	3901.00	18
RT SEAT LNK X	4.55	-177.92	3671.00	3904.00	19
TOTAL SEAT X	10.62	-389.61	3702.00	3902.00	
SEAT LNK Y	45.50	-74.85	3967.00	3906.00	35
LF SEAT PAN Z	670.04	42.43	3904.00	3607.00	11
RT SEAT PAN Z	669.31	34.19	3903.00	3610.00	12
CT SEAT PAN Z	739.19	28.23	3906.00	3820.00	13
TOTAL SEAT Z	2064.17	115.55	3906.00	3603.00	
TOTAL SEAT Z / WT	11.80	0.66	3906.00	3603.00	
RES SEAT FORCE	2099.55	115.60	3906.00	3603.00	
RES SEAT FORCE / WT	12.00	0.66	3906.00	3603.00	
LF FOOT X	10.69	-91.53	3845.00	3899.00	20
RT FOOT X	13.02	-90.07	3846.00	3900.00	23
CT FOOT X	34.01	-117.15	3847.00	3900.00	26
TOTAL FOOT X	55.86	-296.95	3846.00	3900.00	
LF FOOT Y	115.42	-19.09	3994.00	4038.00	21
RT FOOT Y	21.12	-134.18	3722.00	3884.00	24
CT FOOT Y	22.37	-55.05	4081.00	3894.00	27
TOTAL FOOT Y	38.79	-57.46	3924.00	3894.00	
LF FOOT Z	190.62	-18.89	3885.00	3840.00	22
RT FOOT Z	185.72	-8.79	3885.00	4145.00	25
CT FOOT Z	184.51	-44.85	3905.00	4004.00	28
TOTAL FOOT Z	431.87	-34.03	3885.00	3840.00	
RES FOOT FORCE	468.29	21.83	3885.00	4116.00	

HEAD REST POS STUDY TEST: 424 SUBJ: M-2 WT: 163.0 G: 10 GP: 1 CELL: C

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	1821.00	1474.00	48
CARRIAGE X	0.97	-0.95	3867.00	3837.00	36
CARRIAGE Y	0.77	-0.68	3831.00	3836.00	31
CARRIAGE Z	12.25	-0.22	3860.00	3722.00	1
CARRIAGE Z (SM)	10.43	-0.11	3861.00	3757.00	
CARRIAGE VEL	-1.20	-25.85	4184.00	3818.00	29
SEAT X	1.32	-1.17	3830.00	3874.00	32
SEAT Y	0.77	-0.98	3827.00	3834.00	33
SEAT Z	11.97	-0.14	3867.00	3615.00	34
SEAT Z (SM)	10.63	-0.09	3867.00	3717.00	
CHEST X	1.93	-4.10	3867.00	3917.00	5
CHEST Y	0.24	-1.28	3917.00	3848.00	6
CHEST Z	20.08	-0.95	3898.00	3682.00	7
CHEST RES	20.15	0.94	3898.00	3811.00	
CHEST SI	33.38		3827.00	3963.00	
HEAD X	2.16	-5.99	3881.00	3925.00	2
HEAD Y	1.16	-1.89	3951.00	3883.00	3
HEAD Z	11.91	-1.23	3878.00	3646.00	4
HEAD RES	11.63	0.55	3878.00	4148.00	
HEAD SI	15.06		3837.00	4020.00	
HEAD MIC	9.48		3857.00	3901.00	
SHD REFL LF	86.72	24.03	3920.00	3990.00	14
SHD REEL LF	71.06	10.64	3909.00	3872.00	16
LF SHOULDER	149.23	42.20	3911.00	3862.00	
SHD REFL RT	59.78	34.12	3910.00	3860.00	15
SHD REEL RT	84.29	12.99	3913.00	3868.00	17
RT SHOULDER	143.54	48.52	3912.00	3865.00	
TOTAL SHLD REFL	142.92	62.21	3917.00	3990.00	
TOTAL SHLD REEL	152.73	24.30	3911.00	3870.00	
TOTAL SHOULDER	292.51	91.82	3911.00	3863.00	
TOTAL SHD / WT	1.79	0.56	3911.00	3863.00	
LF LAP BELT	36.54	11.47	3974.00	3867.00	8
RT LAP BELT	56.07	19.84	3941.00	3868.00	9
TOTAL LAP	91.44	31.33	3967.00	3868.00	
TOTAL LAP / WT	0.56	0.19	3967.00	3868.00	
CROTCH STRAP	126.53	-45.20	3950.00	3885.00	10
LF SEAT LNK X	44.61	-177.00	4124.00	3876.00	18
RT SEAT LNK X	28.21	-91.91	3831.00	3882.00	19
TOTAL SEAT X	35.57	-267.07	4124.00	3876.00	
SEAT LNK Y	78.45	-56.53	3949.00	3882.00	35
LF SEAT PAN Z	363.10	34.14	3877.00	3774.00	11
RT SEAT PAN Z	403.62	33.58	3877.00	3623.00	12
CT SEAT PAN Z	904.02	72.29	3881.00	3627.00	13
TOTAL SEAT Z	1665.17	150.83	3881.00	3829.00	
TOTAL SEAT Z / WT	10.22	0.93	3881.00	3623.00	
RES SEAT FORCE	1686.06	153.18	3881.00	3623.00	
RES SEAT FORC / WT	10.34	0.94	3881.00	3623.00	
LF FOOT X	10.79	-57.01	3827.00	3875.00	20
RT FOOT X	-6.78	-130.15	4181.00	3878.00	23
CT FOOT X	0.30	-135.65	3830.00	3877.00	26
TOTAL FOOT X	-14.55	-312.88	3828.00	3878.00	
LF FOOT Y	101.27	-26.26	3862.00	3835.00	21
RT FOOT Y	16.75	-135.88	3740.00	3871.00	24
CT FOOT Y	47.49	-30.83	3899.00	3927.00	27
TOTAL FOOT Y	56.55	-90.77	3843.00	3835.00	
LF FOOT Z	192.38	-25.40	3864.00	3834.00	22
RT FOOT Z	166.41	-5.58	3878.00	3647.00	25
CT FOOT Z	172.21	-78.52	3828.00	3844.00	28
TOTAL FOOT Z	491.83	-24.68	3872.00	3821.00	
RES FOOT FORCE	504.36	83.17	3872.00	3654.00	

HEAD REST POS STUDY TEST: 378 SUBJ: M11 WT: 157.0 G: 10 GP: 1 CELL: C

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	215.00	2460.00	48
CARRIAGE X	1.18	-1.29	3853.00	3829.00	36
CARRIAGE Y	0.63	-1.00	3855.00	3895.00	31
CARRIAGE Z	11.74	-0.27	3847.00	3618.00	1
CARRIAGE Z (SM)	10.39	-0.12	3861.00	3616.00	
CARRIAGE VEL	-1.02	-25.64	4100.00	3621.00	29
SEAT X	2.80	-1.37	3816.00	3829.00	32
SEAT Y	0.93	-0.92	3815.00	3900.00	33
SEAT Z	11.64	-0.21	3854.00	3681.00	34
SEAT Z (SM)	10.46	-0.09	3854.00	3663.00	
CHEST X	9.76	-3.79	3869.00	3906.00	5
CHEST Y	0.17	-1.52	3840.00	3928.00	6
CHEST Z	18.77	-0.97	3872.00	3623.00	7
CHEST RES	19.07	0.73	3872.00	3840.00	
CHEST SI	39.65		3813.00	3958.00	
HEAD X	2.77	-3.93	3866.00	3906.00	2
HEAD Y	1.24	-0.43	3727.00	3878.00	3
HEAD Z	12.89	-1.42	3869.00	4145.00	4
HEAD RES	13.11	0.68	3869.00	3819.00	
HEAD SI	18.88		3825.00	3975.00	
HEAD HIC	14.75		3848.00	3895.00	
SHD REFL LF	51.17	5.48	3898.00	4092.00	14
SHD REEL LF	49.44	5.05	3904.00	3653.00	16
LF SHOULDER	95.66	21.01	3901.00	4093.00	
SHD REFL RT	34.07	10.33	3895.00	3962.00	15
SHD REEL RT	55.76	2.25	3909.00	3997.00	17
RT SHOULDER	81.70	24.45	3909.00	3944.00	
TOTAL SHLD REFL	84.95	19.50	3897.00	3963.00	
TOTAL SHLD REEL	100.75	8.93	3908.00	3852.00	
TOTAL SHOULDER	170.31	50.71	3907.00	4083.00	
TOTAL SHD / WT	1.08	0.32	3907.00	4083.00	
LF LAP BELT	43.47	11.16	3971.00	3856.00	8
RT LAP BELT	41.50	10.41	3906.00	3850.00	9
TOTAL LAP	80.26	22.80	3966.00	3850.00	
TOTAL LAP / WT	0.51	0.15	3968.00	3850.00	
CROTCH STRAP	48.60	-36.92	3917.00	3865.00	10
LF SEAT LNK X	34.95	-178.02	4097.00	3868.00	18
RT SEAT LNK X	29.27	-153.20	3818.00	3869.00	19
TOTAL SEAT X	30.14	-330.65	3751.00	3869.00	
SEAT LNK Y	54.05	-50.06	3929.00	3872.00	95
LF SEAT PAN Z	451.77	19.81	3871.00	3625.00	11
RT SEAT PAN Z	559.94	21.08	3872.00	3614.00	12
CT SEAT PAN Z	759.67	34.85	3869.00	3628.00	13
TOTAL SEAT Z	1780.95	87.79	3872.00	3614.00	
TOTAL SEAT Z / WT	11.22	0.56	3872.00	3614.00	
RES SEAT FORCE	1789.99	91.56	3872.00	3614.00	
RES SEAT FORCE / WT	11.40	0.58	3872.00	3614.00	
LF FOOT X	7.25	-106.87	3818.00	3868.00	20
RT FOOT X	10.93	-104.51	3817.00	3876.00	23
CT FOOT X	99.96	-131.77	3817.00	3868.00	26
TOTAL FOOT X	56.43	-334.84	3817.00	3876.00	
LF FOOT Y	115.19	-24.56	3849.00	3923.00	21
RT FOOT Y	24.30	-141.65	3667.00	3850.00	24
CT FOOT Y	44.32	-25.99	3838.00	3935.00	27
TOTAL FOOT Y	62.35	-61.84	3837.00	3667.00	
LF FOOT Z	171.66	-30.93	3850.00	3807.00	22
RT FOOT Z	194.08	-33.79	3867.00	3936.00	25
CT FOOT Z	147.68	-72.45	3881.00	3807.00	28
TOTAL FOOT Z	464.64	-100.99	3850.00	3807.00	
RES FOOT FORCE	504.75	18.32	3850.00	3954.00	

HEAD REST POS STUDY TEST: 375 SUBJ: M10 WT: 140.0 G: 10 GP: 2 CELL: C

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.06	9.97	536.00	3980.00	48
CARRIAGE X	1.85	-1.76	3816.00	3802.00	36
CARRIAGE Y	0.46	-1.17	3839.00	3803.00	31
CARRIAGE Z	12.46	-0.32	3821.00	3722.00	1
CARRIAGE Z (SM)	10.56	-0.15	3823.00	3721.00	
CARRIAGE VEL	-1.08	-25.64	4099.00	3775.00	29
SEAT X	2.27	-1.68	3793.00	3802.00	32
SEAT Y	0.58	-0.73	3809.00	3824.00	33
SEAT Z	11.26	-0.24	3828.00	3606.00	34
SEAT Z (SM)	10.36	-0.17	3829.00	3643.00	
CHEST X	5.16	-2.17	3845.00	3870.00	5
CHEST Y	0.23	-1.75	3879.00	3863.00	6
CHEST Z	17.67	-1.02	3858.00	3715.00	7
CHEST RES	17.74	0.43	3858.00	3698.00	
CHEST SI	31.71		3789.00	4016.00	
HEAD X	2.09	-3.43	3849.00	3862.00	2
HEAD Y	1.73	-1.31	3891.00	3855.00	3
HEAD Z	14.37	-1.20	3841.00	3981.00	4
HEAD RES	14.49	0.54	3841.00	3794.00	
HEAD SI	22.92		3797.00	3936.00	
HEAD HIC	17.94		3820.00	3862.00	
SHD REFL LF	39.03	6.13	3862.00	4093.00	14
SHD REEL LF	38.36	1.29	3875.00	3825.00	16
LF SHOULDER	69.99	11.41	3875.00	4094.00	
SHD REFL RT	43.35	18.73	3844.00	4100.00	15
SHD REEL RT	42.37	-3.30	3863.00	3977.00	17
RT SHOULDER	75.98	18.09	3862.00	3976.00	
TOTAL SHLD REFL	79.21	26.39	3861.00	4092.00	
TOTAL SHLD REEL	71.71	-1.15	3872.00	3977.00	
TOTAL SHOULDER	133.52	33.20	3865.00	3976.00	
TOTAL SHD / WT	0.85	0.24	3865.00	3976.00	
LF LAP BELT	37.62	12.40	3879.00	3821.00	8
RT LAP BELT	32.43	14.27	3691.00	3831.00	9
TOTAL LAP	69.12	27.22	3879.00	3830.00	
TOTAL LAP / WT	0.49	0.19	3879.00	3830.00	
CROTCH STRAP	118.65	-26.46	4055.00	3844.00	10
LF SEAT LNK X	50.24	-148.92	4052.00	3835.00	18
RT SEAT LNK X	44.86	-120.49	3793.00	3837.00	19
TOTAL SEAT X	44.16	-266.53	4060.00	3837.00	
SEAT LNK Y	57.26	-33.53	3894.00	3834.00	35
LF SEAT PAN Z	340.13	10.37	3839.00	3629.00	11
RT SEAT PAN Z	389.32	6.22	3838.00	3601.00	12
CT SEAT PAN Z	889.95	41.95	3841.00	3636.00	13
TOTAL SEAT Z	1612.33	65.68	3839.00	3601.00	
TOTAL SEAT Z / WT	11.52	0.47	3839.00	3601.00	
RES SEAT FORCE	1634.33	70.37	3839.00	3601.00	
RES SEAT FORCE / WT	11.67	0.50	3839.00	3601.00	
LF FOOT X	6.36	-136.49	3793.00	3850.00	20
RT FOOT X	29.03	-82.00	3791.00	3841.00	23
CT FOOT X	31.81	-142.61	3792.00	3840.00	26
TOTAL FOOT X	83.60	-353.10	3792.00	3840.00	
LF FOOT Y	133.33	-19.53	3833.00	3781.00	21
RT FOOT Y	17.22	-139.86	3653.00	3841.00	24
CT FOOT Y	36.76	-42.45	3812.00	3838.00	27
TOTAL FOOT Y	45.77	-65.28	3869.00	3905.00	
LF FOOT Z	154.93	-65.36	3849.00	3801.00	22
RT FOOT Z	162.95	-43.46	3841.00	3783.00	25
CT FOOT Z	204.06	-117.63	3790.00	3805.00	28
TOTAL FOOT Z	445.71	-200.67	3790.00	3783.00	
RES FOOT FORCE	515.64	28.82	3841.00	3616.00	

HEAD REST POS STUDY TEST: 405 SUBJ: M13 WT: 170.0 G: 10 GP: 1 CELL: C

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.06	9.97	219.00	3436.00	48
CARRIAGE X	1.28	-1.10	3878.00	3891.00	36
CARRIAGE Y	0.39	-1.41	3980.00	3893.00	31
CARRIAGE Z	12.30	-0.23	3910.00	3717.00	1
CARRIAGE Z (SM)	10.43	-0.12	3910.00	3716.00	
CARRIAGE VEL	-1.28	-25.96	4180.00	3881.00	29
SEAT X	1.06	-1.51	3877.00	3923.00	32
SEAT Y	0.97	-1.09	3878.00	3864.00	33
SEAT Z	11.85	-0.34	3916.00	3739.00	34
SEAT Z (SM)	10.66	-0.21	3917.00	3739.00	
CHEST X	3.36	-2.01	3927.00	3974.00	5
CHEST Y	0.97	-4.18	3901.00	3931.00	6
CHEST Z	25.04	-2.48	3938.00	3918.00	7
CHEST RES	25.23	0.66	3936.00	3618.00	
CHEST SI	47.31		3743.00	4016.00	
HEAD X	0.32	-5.38	3629.00	3969.00	2
HEAD Y	1.66	-0.27	4022.00	3964.00	3
HEAD Z	19.15	-1.00	3932.00	3608.00	4
HEAD RES	19.21	0.84	3932.00	3601.00	
HEAD SI	19.61		3883.00	4130.00	
HEAD HIC	14.63		3905.00	3980.00	
SHD REEL LF	56.51	17.04	3967.00	3913.00	14
SHD REEL LF	66.29	4.75	3967.00	3913.00	16
LF SHOULDER	122.80	21.78	3967.00	3913.00	
SHD REEL RT	80.19	28.68	3957.00	3910.00	15
SHD REEL RT	84.26	6.68	3956.00	3925.00	17
RT SHOULDER	164.32	41.61	3956.00	3924.00	
TOTAL SHLD REEL	135.68	46.56	3958.00	3912.00	
TOTAL SHLD REEL	130.38	14.21	3964.00	3925.00	
TOTAL SHOULDER	265.70	65.55	3964.00	3913.00	
TOTAL SHD / WT	1.56	0.39	3964.00	3913.00	
LF LAP BELT	91.91	2.02	4015.00	3916.00	8
RT LAP BELT	90.79	3.76	4098.00	3917.00	9
TOTAL LAP	58.03	5.81	4017.00	3916.00	
TOTAL LAP / WT	0.96	0.03	4017.00	3916.00	
CROTCH STRAP	178.98	6.38	4009.00	3924.00	10
LF SEAT LNK X	32.04	-260.94	4024.00	3925.00	18
RT SEAT LNK X	22.60	-85.64	3882.00	3924.00	19
TOTAL SEAT X	27.29	-344.28	3744.00	3924.00	
SEAT LNK Y	59.55	-123.86	4004.00	3932.00	35
LF SEAT PAN Z	497.22	14.16	3925.00	3621.00	11
RT SEAT PAN Z	311.59	11.10	3925.00	3634.00	12
CT SEAT PAN Z	867.02	33.48	3928.00	3602.00	13
TOTAL SEAT Z	1665.83	74.89	3928.00	3621.00	
TOTAL SEAT Z / WT	9.80	0.44	3928.00	3621.00	
RES SEAT FORCE	1702.18	76.62	3928.00	3621.00	
RES SEAT FORCE / WT	10.01	0.45	3928.00	3621.00	
LF FOOT X	-5.46	-147.41	3878.00	3927.00	20
RT FOOT X	5.16	-106.75	3879.00	3927.00	23
CT FOOT X	-1.63	-162.62	3879.00	3928.00	26
TOTAL FOOT X	-4.84	-414.06	3879.00	3928.00	
LF FOOT Y	144.84	-25.49	3912.00	3766.00	21
RT FOOT Y	25.10	-144.40	3806.00	3911.00	24
CT FOOT Y	39.57	-47.42	3892.00	3922.00	27
TOTAL FOOT Y	59.66	-65.82	3951.00	3922.00	
LF FOOT Z	184.02	9.37	3912.00	3989.00	22
RT FOOT Z	192.24	13.61	3913.00	4029.00	25
CT FOOT Z	172.54	-108.41	3959.00	3624.00	28
TOTAL FOOT Z	484.01	-13.86	3921.00	3869.00	
RES FOOT FORCE	570.14	88.70	3921.00	3880.00	

HEAD REST POS STUDY TEST: 392 SUBJ: 3-2 WT: 146.0 G: 10 GP: 1 CELL: C

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.04	9.96	1457.00	1428.00	48
CARRIAGE X	1.38	-1.10	3828.00	3820.00	36
CARRIAGE Y	0.79	-0.72	3826.00	3771.00	31
CARRIAGE Z	12.73	-0.17	3821.00	3606.00	1
CARRIAGE Z (SM)	10.71	-0.10	3821.00	3629.00	
CARRIAGE VEL	-0.95	-25.67	4126.00	3786.00	29
SEAT X	1.13	-1.60	3782.00	3820.00	32
SEAT Y	0.59	-0.74	3782.00	3845.00	33
SEAT Z	11.89	-0.24	3828.00	3659.00	34
SEAT Z (SM)	10.77	-0.11	3829.00	3646.00	
CHEST X	5.69	-0.79	3840.00	3882.00	5
CHEST Y	1.06	-2.38	3834.00	3856.00	6
CHEST Z	16.25	-1.26	3856.00	3690.00	7
CHEST RES	16.75	0.28	3857.00	3700.00	
CHEST SI	32.99		3785.00	3824.00	
HEAD X	.32	-4.49	3637.00	3881.00	2
HEAD Y	1.14	-1.16	3909.00	3841.00	3
HEAD Z	14.21	-0.76	3839.00	3603.00	4
HEAD RES	14.41	0.37	3839.00	4182.00	
HEAD SI	20.90		3793.00	4052.00	
HEAD HIC	14.43		3818.00	3861.00	
SHD REFL LF	33.01	11.48	3869.00	4094.00	14
SHD REEL LF	27.90	5.96	3929.00	3828.00	16
LF SHOULDER	51.99	26.29	3869.00	4100.00	
SHD REFL RT	32.39	15.15	3860.00	4062.00	15
SHD REEL RT	40.12	1.59	3875.00	3829.00	17
RT SHOULDER	69.06	25.32	3873.00	3825.00	
TOTAL SHLD REFL	65.21	28.19	3849.00	4060.00	
TOTAL SHLD REEL	62.10	7.66	3876.00	3828.00	
TOTAL SHOULDER	120.70	53.70	3869.00	3823.00	
TOTAL SHD / WT	0.83	0.37	3869.00	3823.00	
LF LAP BELT	94.00	0.00	3933.00	3834.00	8
RT LAP BELT	99.74	4.75	3934.00	3829.00	9
TOTAL LAP	73.47	7.57	3933.00	3832.00	
TOTAL LAP / WT	0.50	0.05	3933.00	3832.00	
CROTCH STRAP	28.20	-34.16	3915.00	3846.00	10
LF SEAT LNK X	54.82	-119.01	3936.00	3838.00	18
RT SEAT LNK X	52.95	-53.42	3792.00	3837.00	19
TOTAL SEAT X	77.04	-171.85	3894.00	3837.00	
SEAT LNK Y	71.21	-8.09	3988.00	3795.00	35
LF SEAT PAN Z	274.53	11.26	3837.00	3602.00	11
RT SEAT PAN Z	340.17	6.00	3847.00	3651.00	12
CT SEAT PAN Z	979.76	76.80	3839.00	3653.00	13
TOTAL SEAT Z	1579.04	106.76	3839.00	3602.00	
TOTAL SEAT Z / WT	10.82	0.73	3839.00	3602.00	
RES SEAT FORCE	1587.72	115.40	3839.00	3649.00	
RES SEAT FORCE / WT	10.87	0.79	3839.00	3649.00	
LF FOOT X	-5.17	-175.15	3675.00	3839.00	20
RT FOOT X	9.52	-124.42	3787.00	3838.00	23
CT FOOT X	1.31	-195.47	4200.00	3839.00	26
TOTAL FOOT X	1.18	-495.03	3787.00	3839.00	
LF FOOT Y	147.70	-16.51	3833.00	4026.00	21
RT FOOT Y	22.75	-129.00	3891.00	3822.00	24
CT FOOT Y	16.66	-53.65	3789.00	3842.00	27
TOTAL FOOT Y	59.64	-62.77	3814.00	3842.00	
LF FOOT Z	186.53	-6.72	3849.00	3916.00	22
RT FOOT Z	196.30	-7.42	3850.00	3798.00	25
CT FOOT Z	190.90	-91.00	3839.00	3778.00	28
TOTAL FOOT Z	430.27	-67.71	3849.00	3778.00	
RES FOOT FORCE	585.77	22.88	3841.00	3925.00	

HEAD REST POS STUDY TEST: 370 SUBJ: A-1 WT: 194.0 G: 10 GP: 2 CELL: C

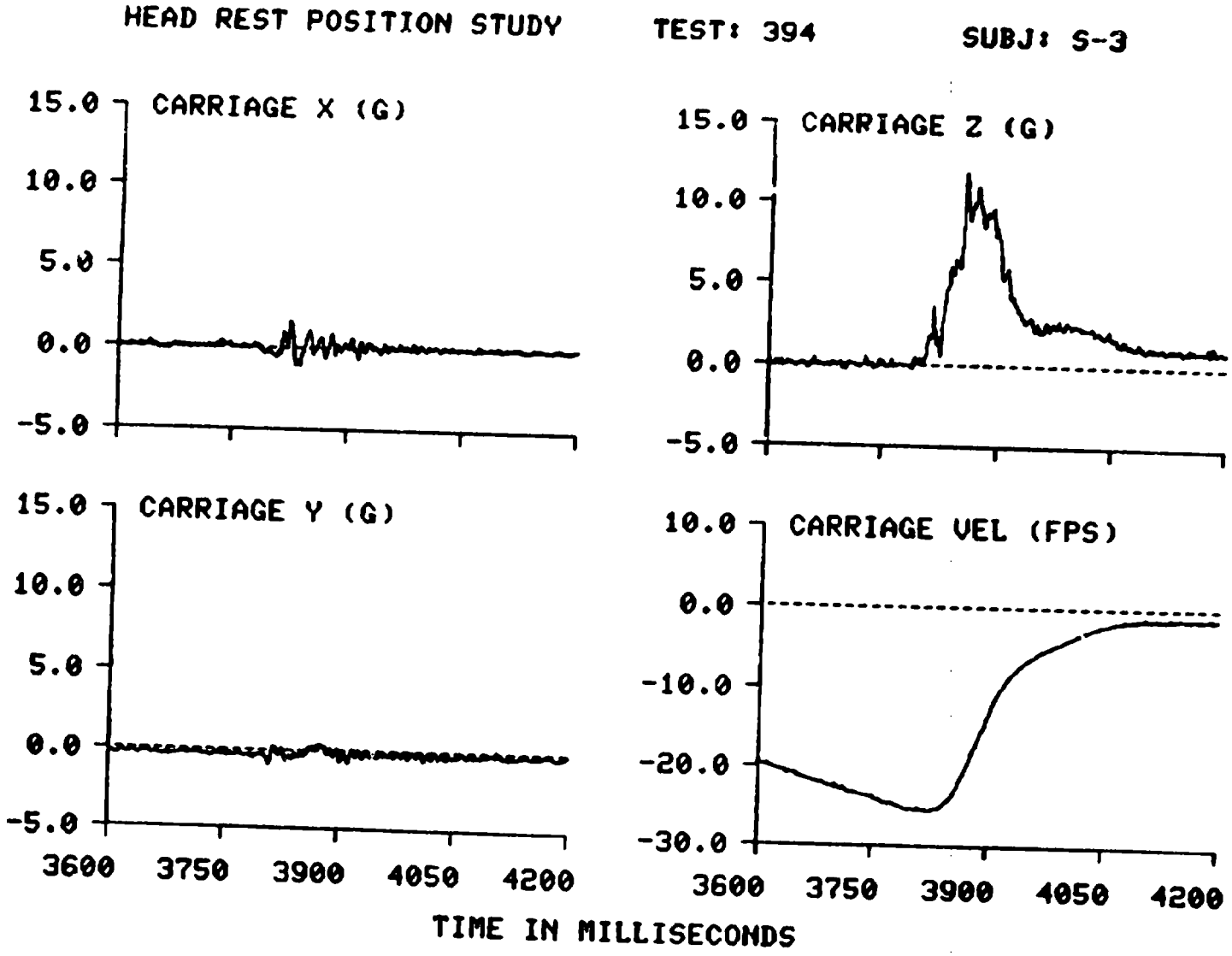
DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.08	9.97	11.00	2819.00	48
CARRIAGE X	1.56	-1.19	3830.00	3824.00	36
CARRIAGE Y	0.86	-1.02	9830.00	3935.00	31
CARRIAGE Z	19.06	-0.34	3825.00	3608.00	1
CARRIAGE Z (SM)	10.71	-0.10	3825.00	3632.00	
CARRIAGE VEL	-0.98	-25.75	4102.00	3790.00	29
SEAT X	1.96	-1.72	3829.00	3824.00	32
SEAT Y	0.93	-1.80	3785.00	3784.00	33
SEAT Z	11.69	-0.31	3832.00	3657.00	34
SEAT Z (SM)	10.69	-0.19	3832.00	3649.00	
CHEST X	6.35	-0.94	3851.00	3901.00	5
CHEST Y	-0.46	-3.26	3955.00	3868.00	6
CHEST Z	16.50	-1.00	3869.00	3845.00	7
CHEST RES	17.39	1.05	3861.00	3745.00	
CHEST SI	33.06		3795.00	3911.00	
HEAD X	2.68	-3.84	3839.00	3880.00	2
HEAD Y	0.66	-1.16	3687.00	3847.00	3
HEAD Z	12.91	-0.79	3851.00	3655.00	4
HEAD RES	12.50	0.35	3848.00	4074.00	
HEAD SI	21.29		3795.00	4052.00	
HEAD HIC	17.09		3823.00	3888.00	
SHD REFL LF	71.44	14.54	3861.00	4092.00	14
SHD REEL LF	75.12	19.10	3909.00	3837.00	16
LF SHOULDER	125.86	46.42	3864.00	4092.00	
SHD REFL RT	43.43	19.44	3865.00	3955.00	15
SHD REEL RT	64.36	1.82	3913.00	3834.00	17
RT SHOULDER	97.73	22.10	3912.00	3825.00	
TOTAL SHLD REFL	114.14	32.95	3862.00	4:00.00	
TOTAL SHLD REEL	133.12	15.50	3910.00	3835.00	
TOTAL SHOULDER	212.68	72.58	3910.00	3827.00	
TOTAL SHD / WT	1.10	0.37	3910.00	3827.00	
LF LAP BELT	65.20	44.68	3867.00	3835.00	8
RT LAP BELT	75.76	46.80	3892.00	4099.00	9
TOTAL LAP	135.70	93.58	3892.00	3834.00	
TOTAL LAP / WT	0.70	0.48	3892.00	3834.00	
CROTCH STRAP	140.71	-111.74	3918.00	3857.00	10
LF SEAT LNK X	44.85	-135.89	3939.00	3845.00	18
RT SEAT LNK X	11.78	-169.69	3791.00	3847.00	19
TOTAL SEAT X	95.35	-296.68	4070.00	3845.00	
SEAT LNK Y	84.36	-30.41	4115.00	3800.00	35
LF SEAT PAN Z	424.96	28.98	3849.00	3656.00	11
RT SEAT PAN Z	808.12	57.02	3846.00	3800.00	12
CT SEAT PAN Z	797.90	59.88	3848.00	3811.00	13
TOTAL SEAT Z	1696.12	159.50	3848.00	3600.00	
TOTAL SEAT Z / WT	9.77	0.82	3848.00	3600.00	
RES SEAT FORCE	1918.20	159.64	3848.00	3600.00	
RES SEAT FORCE / WT	9.89	0.82	3840.00	3600.00	
LF FOOT X	-92.19	-220.24	3809.00	3840.00	20
RT FOOT X	-26.81	-193.35	3678.00	3842.00	23
CT FOOT X	-58.76	-273.42	9787.00	3843.00	26
TOTAL FOOT X	-159.61	-677.09	3787.00	3842.00	
LF FOOT Y	189.61	-25.26	3827.00	4085.00	21
RT FOOT Y	93.85	-181.76	3898.00	3835.00	24
CT FOOT Y	25.04	-43.48	3943.00	3837.00	27
TOTAL FOOT Y	48.47	-62.09	3869.00	3848.00	
LF FOOT Z	314.87	33.27	3828.00	3965.00	22
RT FOOT Z	262.70	47.59	3835.00	4183.00	25
CT FOOT Z	148.80	-117.42	3834.00	3799.00	28
TOTAL FOOT Z	622.78	34.37	3835.00	3797.00	
RES FOOT FORCE	838.08	194.89	3844.00	4199.00	

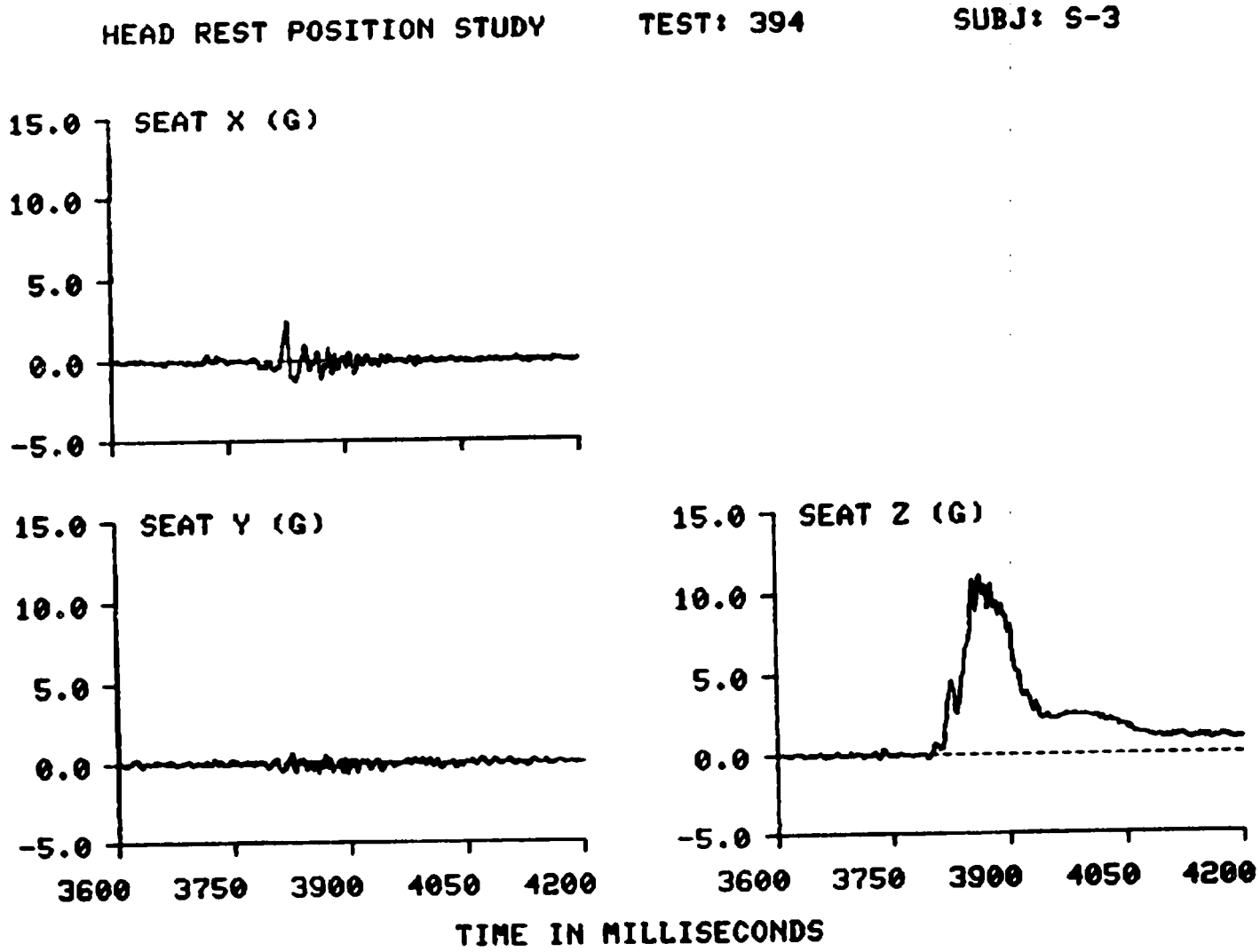
HEAD REST POS STUDY TEST: 400 SUBJ: R-3 WT: 146.0 G: 10 GP: 2 CELL: C

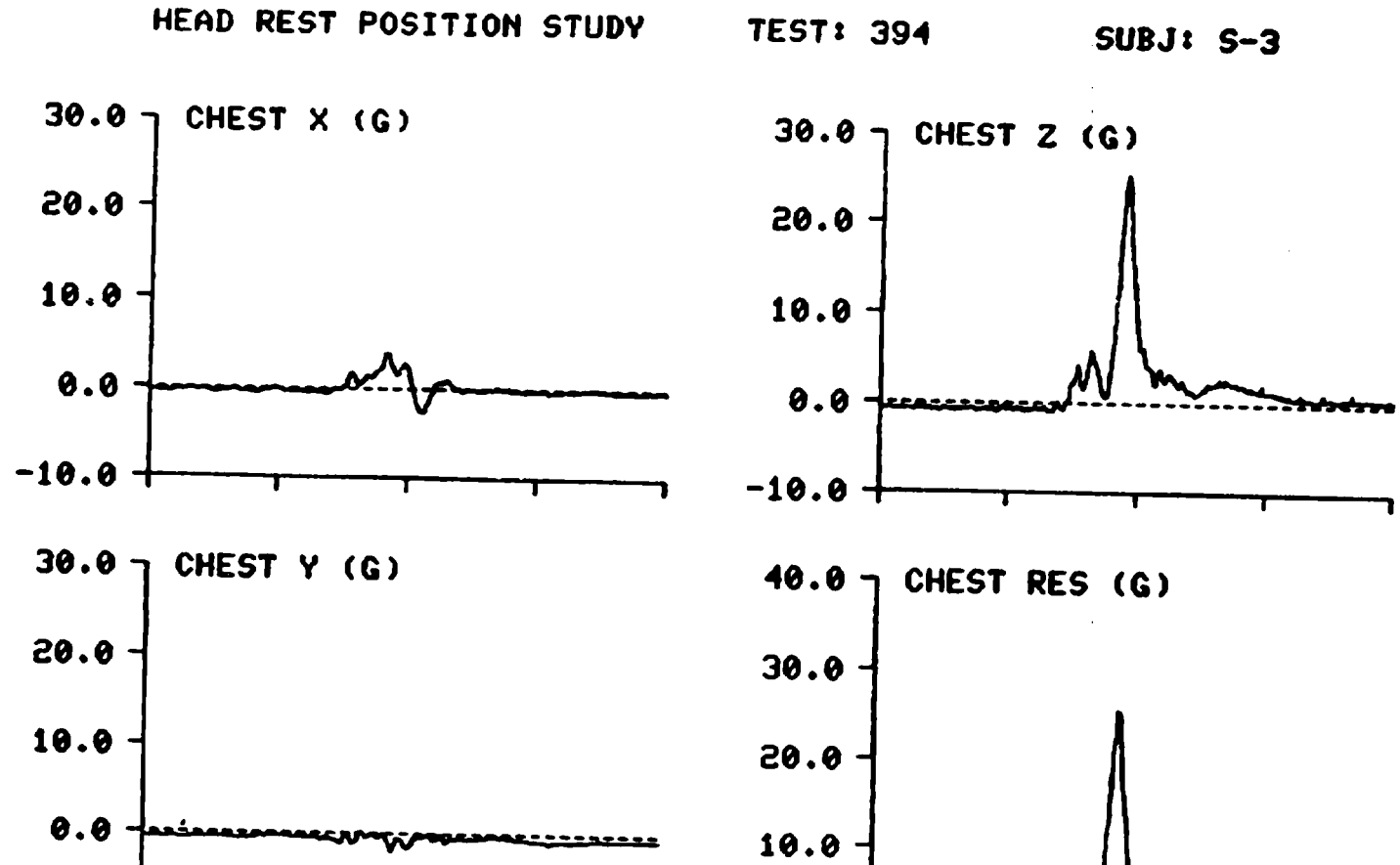
DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	1308.00	2156.00	48
CARRIAGE X	1.52	-1.17	3864.00	3870.00	36
CARRIAGE Y	0.45	-0.74	3903.00	3870.00	31
CARRIAGE Z	12.01	-0.26	3893.00	3655.00	1
CARRIAGE Z (SM)	10.41	-0.11	3908.00	3604.00	
CARRIAGE VEL	-1.15	-25.55	4119.00	3859.00	29
SEAT X	1.30	-1.66	3865.00	3871.00	32
SEAT Y	0.80	-1.98	3909.00	3914.00	33
SEAT Z	11.94	-0.21	3900.00	3659.00	34
SEAT Z (SM)	10.65	-0.16	3900.00	3696.00	
CHEST X	5.12	-1.98	3918.00	3954.00	5
CHEST Y	0.86	-2.04	3896.00	3908.00	6
CHEST RES	18.92	-1.31	3932.00	3698.00	7
CHEST SI	17.30	0.63	3932.00	3711.00	
HEAD X	27.34		3857.00	4000.00	
HEAD Y	0.70	-5.39	3859.00	3957.00	2
HEAD Z	1.36	-1.17	3988.00	3927.00	3
HEAD RES	19.32	-0.91	3917.00	3627.00	4
HEAD SI	13.33	0.73	3917.00	4198.00	
HEAD HIC	19.22		3867.00	4061.00	
SHD REFL LF	12.69		3889.00	3935.00	
SHD REEL LF	64.04	20.65	3948.00	4027.00	14
LF SHOULDER	48.27	2.00	3951.00	3895.00	16
SHD REFL RT	112.33	33.49	3950.00	4026.00	
SHD REEL RT	48.32	22.66	3944.00	4027.00	15
RT SHOULDER	67.03	11.65	3948.00	3909.00	17
TOTAL SHLD REFL	114.00	46.33	3946.00	4043.00	
TOTAL SHLD REEL	110.82	49.91	3947.00	4027.00	
TOTAL SHOULDER	114.87	15.94	3949.00	3909.00	
TOTAL SHD / WT	224.50	83.64	3948.00	4032.00	
LF LAP BELT	1.54	0.57	3948.00	4032.00	
RT LAP BELT	56.90	16.65	3993.00	3909.00	8
TOTAL LAP	88.34	25.64	3993.00	3902.00	9
TOTAL LAP / WT	125.24	43.92	3993.00	3903.00	
CROTCH STRAP	0.86	0.30	3993.00	3903.00	
LF SEAT LNK X	34.06	-50.85	3996.00	3893.00	10
RT SEAT LNK X	50.51	-140.58	4145.00	3911.00	18
TOTAL SEAT X	19.99	-79.47	3981.00	3910.00	19
SEAT LNK Y	56.90	-213.48	3995.00	3910.00	
LF SEAT PAN Z	66.79	-82.11	3977.00	3915.00	35
RT SEAT PAN Z	420.16	32.04	3913.00	3608.00	11
CT SEAT PAN Z	417.09	46.04	3910.00	3624.00	12
TOTAL SEAT Z	792.72	67.24	3914.00	3619.00	13
TOTAL SEAT Z / WT	1554.18	162.18	3912.00	3624.00	
RES SEAT FORCE	10.65	1.11	3912.00	3624.00	
RES SEAT FORCE / WT	1570.47	164.80	3912.00	3624.00	
LF FOOT X	10.76	1.13	3912.00	3624.00	
RT FOOT X	9.98	-98.21	3885.00	3911.00	20
CT FOOT X	14.82	-72.41	3899.00	3912.00	23
TOTAL FOOT X	62.66	-130.53	3866.00	3912.00	26
LF FOOT Y	74.44	-300.25	3866.00	3912.00	
RT FOOT Y	115.05	-21.21	3896.00	4004.00	21
CT FOOT Y	20.58	-110.77	3981.00	3904.00	24
TOTAL FOOT Y	25.72	-63.28	3946.00	3906.00	27
LF FOOT Z	85.74	-80.70	3883.00	3923.00	
RT FOOT Z	184.45	-57.03	3920.00	3867.00	22
CT FOOT Z	162.35	-30.80	3912.00	3865.00	25
TOTAL FOOT Z	155.98	-90.57	3898.00	3874.00	28
RES FOOT FORCE	423.95	-50.48	3920.00	3980.00	
	481.05	7.92	3920.00	3614.00	

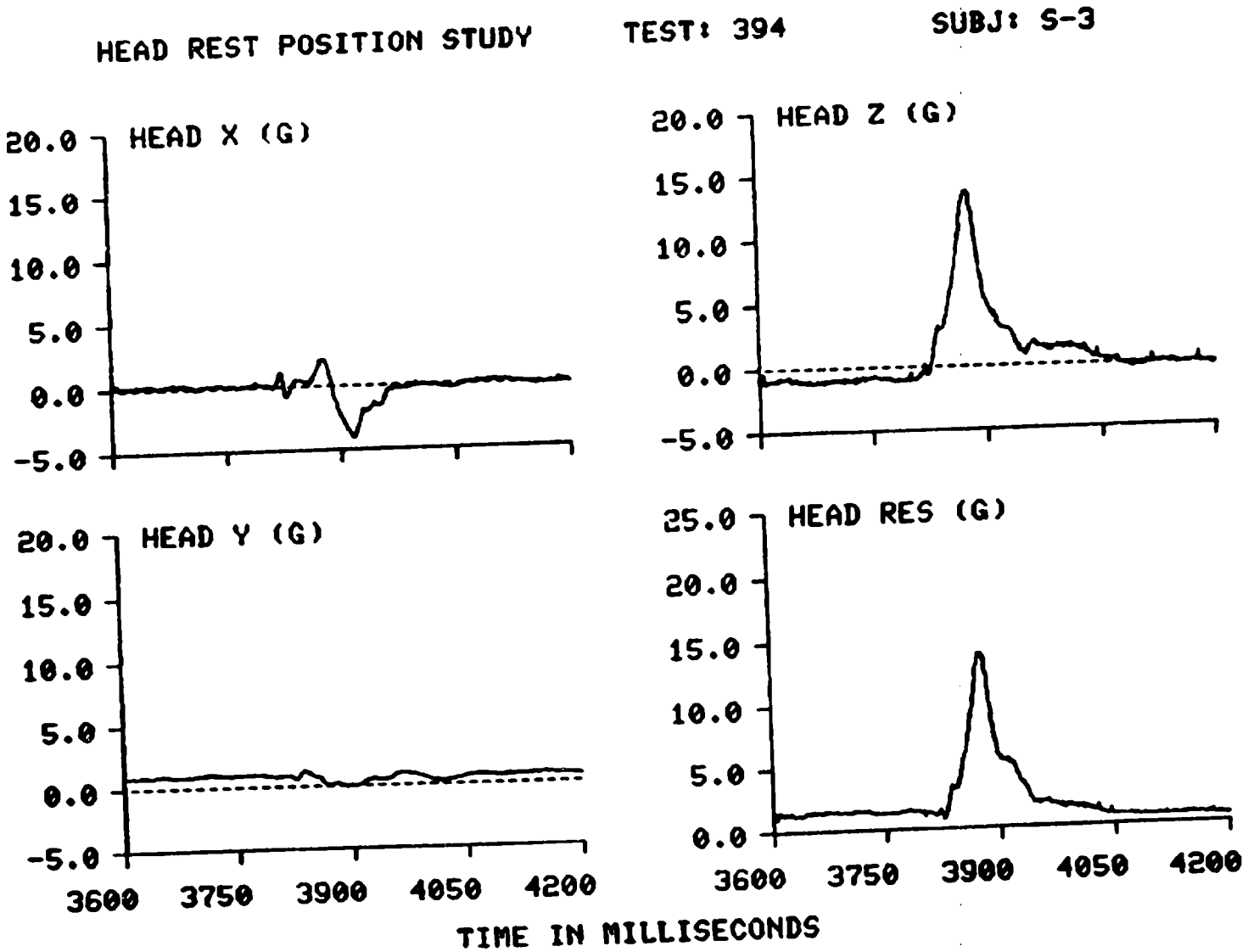
HEAD REST POS STUDY TEST: 394 SUBJ: S-3 WT: 165.0 G: 10 OP: 2 CELL: C

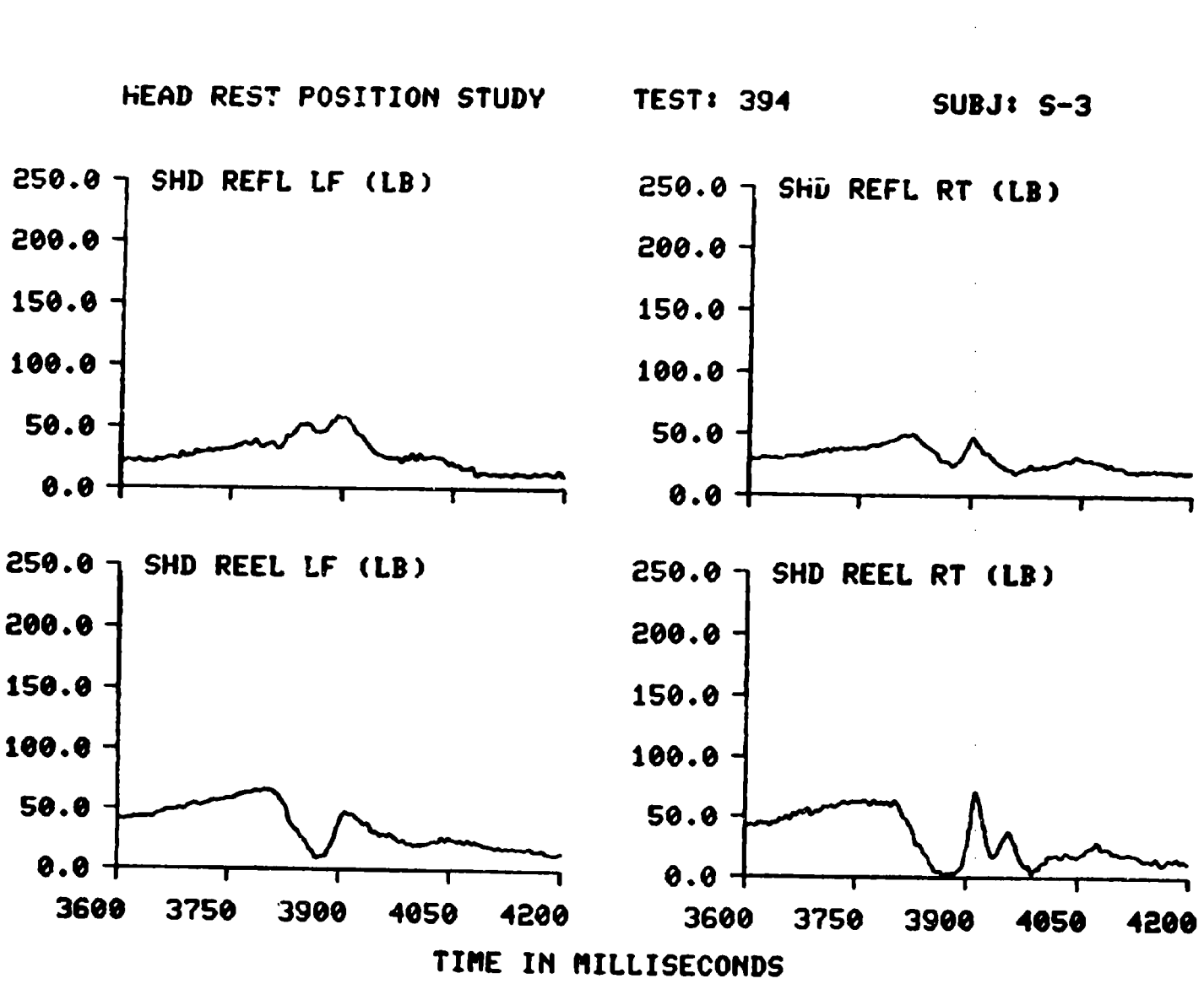
DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	1439.00	3431.00	48
CARRIAGE X	1.63	-1.11	3825.00	3838.00	96
CARRIAGE Y	0.97	-0.95	3877.00	3809.00	91
CARRIAGE Z	11.84	-0.31	3856.00	3702.00	1
CARRIAGE Z (SM)	10.37	-0.18	3857.00	3700.00	
CARRIAGE VEL	-1.03	-25.55	4149.00	3820.00	29
SEAT X	2.46	-1.32	3825.00	3837.00	32
SEAT Y	0.88	-0.65	3824.00	3896.00	33
SEAT Z	11.09	-0.31	3863.00	3795.00	34
SEAT Z (SM)	10.38	-0.18	3864.00	3664.00	
CHEST X	9.97	-2.62	3875.00	3917.00	5
CHEST Y	0.11	-2.16	3855.00	3890.00	6
CHEST Z	25.99	-0.98	3887.00	3668.00	7
CHEST RES	43.06	0.51	3887.00	3743.00	
CHEST SI	2.17		3821.00	3966.00	
HEAD X	1.25	-4.02	3877.00	3917.00	2
HEAD Y	13.89	-0.10	3836.00	3893.00	3
HEAD Z	13.87	-1.24	3877.00	3609.00	4
HEAD RES	18.79	0.57	3877.00	4200.00	
HEAD SI	14.14		3831.00	3952.00	
HEAD HIC	60.02		3853.00	3898.00	
SHD REFL LF	47.88	11.44	3903.00	4082.00	14
SHD REEL LF	104.16	8.53	3909.00	3870.00	16
LF SHOULDER	47.02	31.97	3906.00	4098.00	
SHD REFL RT	69.48	18.38	3903.00	3960.00	15
SHD REEL RT	109.68	1.60	3913.00	3870.00	17
RT SHOULDER	107.09	25.31	3912.00	3989.00	
TOTAL SHLD REFL	115.46	95.35	3903.00	4098.00	
TOTAL SHLD REEL	209.19	10.13	3912.00	3870.00	
TOTAL SHOULDER	1.27	72.55	3911.00	3990.00	
TOTAL SHD / WT	41.81	0.44	3911.00	3990.00	
LF LAP BELT	80.61	16.60	3911.00	3876.00	8
RT LAP BELT	101.50	30.98	3920.00	3860.00	9
TOTAL LAP	0.62	49.12	3920.00	3859.00	
TOTAL LAP / WT	77.82	0.30	3920.00	3859.00	
CROTCH STRAP	48.72	-66.22	3959.00	3871.00	10
LF SEAT LNK X	25.69	-165.40	3961.00	3871.00	18
RT SEAT LNK X	27.90	-147.30	3926.00	3872.00	19
TOTAL SEAT X	82.30	-311.47	4085.00	3871.00	
SEAT LNK Y	406.35	-38.16	3942.00	3876.00	35
LF SEAT PAN Z	488.73	31.74	3872.00	3789.00	11
RT SEAT PAN Z	857.50	41.84	3887.00	3643.00	12
CT SEAT PAN Z	1689.28	53.51	3874.00	3800.00	13
TOTAL SEAT Z	10.24	143.25	3873.00	3612.00	
TOTAL SEAT Z / WT	1716.92	0.87	3873.00	3612.00	
RES SEAT FORCE	10.41	144.47	3873.00	3612.00	
RES SEAT FORCE / WT	14.57	0.88	3873.00	3612.00	
LF FOOT X	15.67	-95.79	3827.00	3874.00	20
RT FOOT X	55.87	-46.01	3619.00	3884.00	23
CT FOOT X	68.43	-165.06	3828.00	3871.00	26
TOTAL FOOT X	79.38	-282.10	3827.00	3874.00	
LF FOOT Y	27.08	-20.19	3848.00	3834.00	21
RT FOOT Y	30.40	-82.96	3907.00	3874.00	24
CT FOOT Y	68.72	-79.06	3827.00	3889.00	27
TOTAL FOOT Y	151.58	-92.20	3647.00	3877.00	
LF FOOT Z	109.69	-56.62	3849.00	3890.00	22
RT FOOT Z	390.19	-135.22	3824.00	3855.00	25
CT FOOT Z	446.70	-117.98	3880.00	3837.00	28
TOTAL FOOT Z	482.06	-196.21	3849.00	3837.00	
RES FOOT FORCE		3.21	3875.00	3773.00	

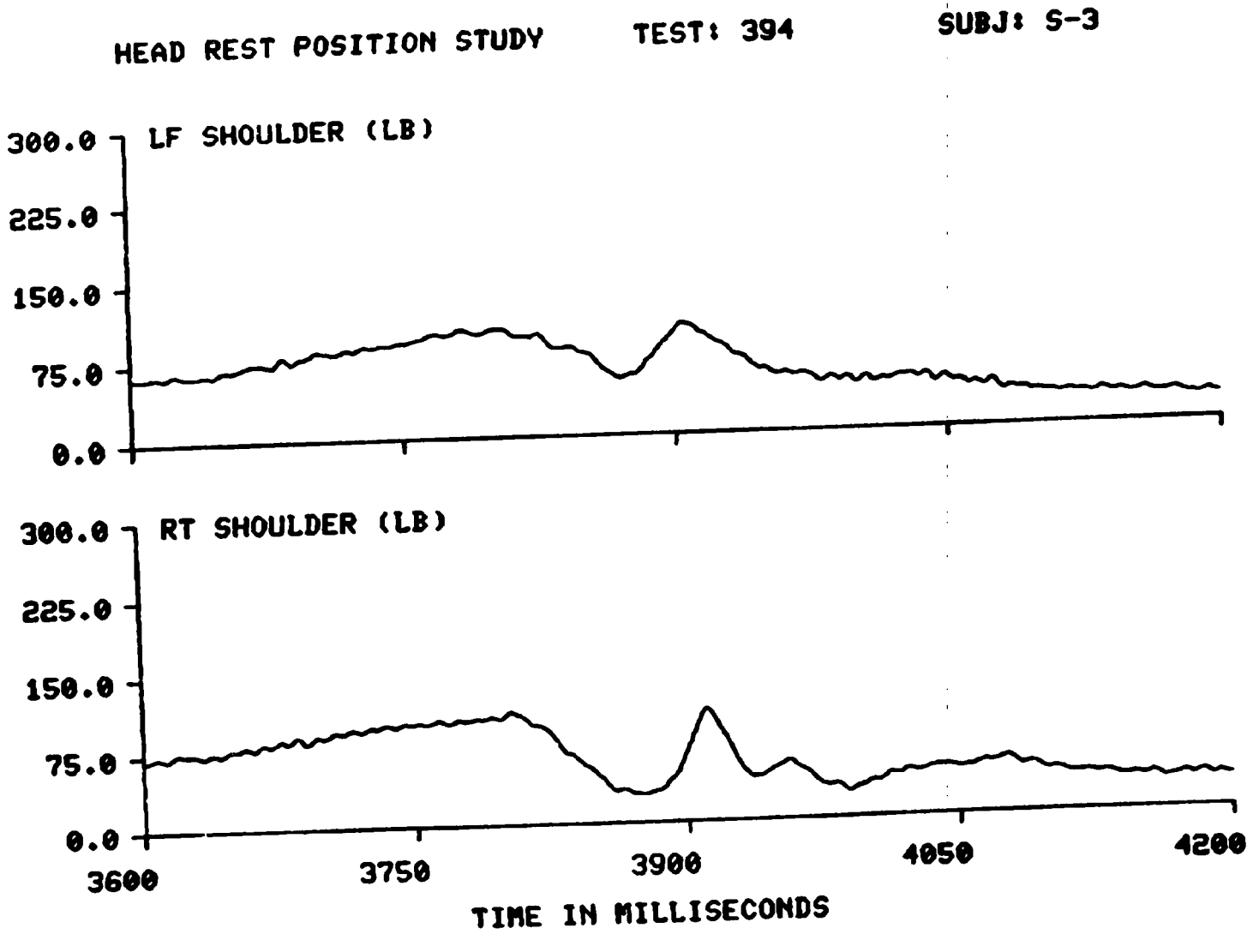

HEAD REST POSITION STUDY
TEST: 394
SUBJ: S-3
CARRIAGE X (G)
15.0
10.0
5.0
0.0
-5.0
CARRIAGE Z (G)
15.0
10.0
5.0
0.0
-5.0
CARRIAGE Y (G)
15.0
10.0
5.0
0.0
-5.0
CARRIAGE VEL (FPS)
10.0
0.0
-10.0
-20.0
-30.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

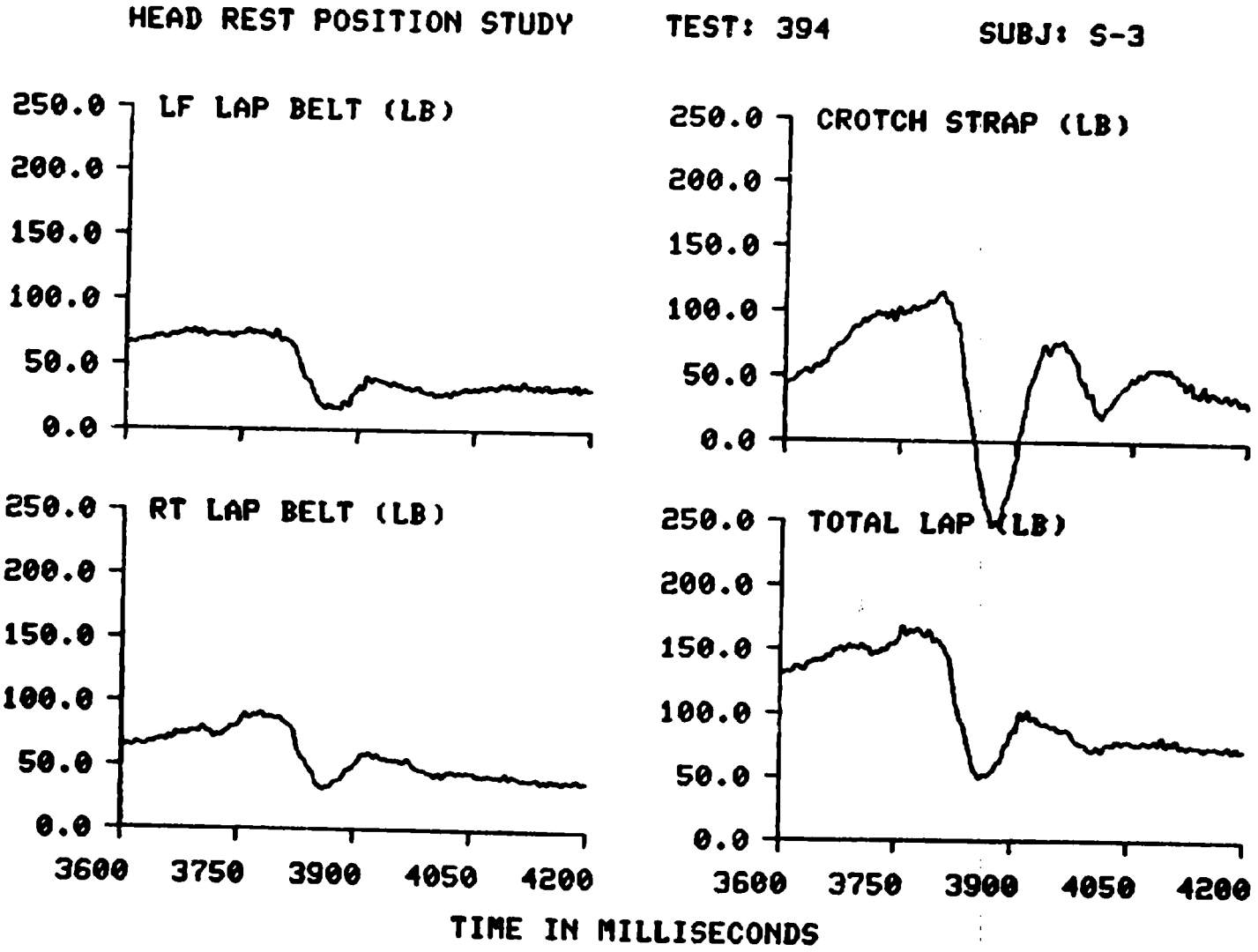

HEAD REST POSITION STUDY
TEST: 394
SUBJ: S-3
SEAT X (G)
15.0
10.0
5.0
0.0
-5.0
SEAT Y (G)
SEAT Z (G)
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

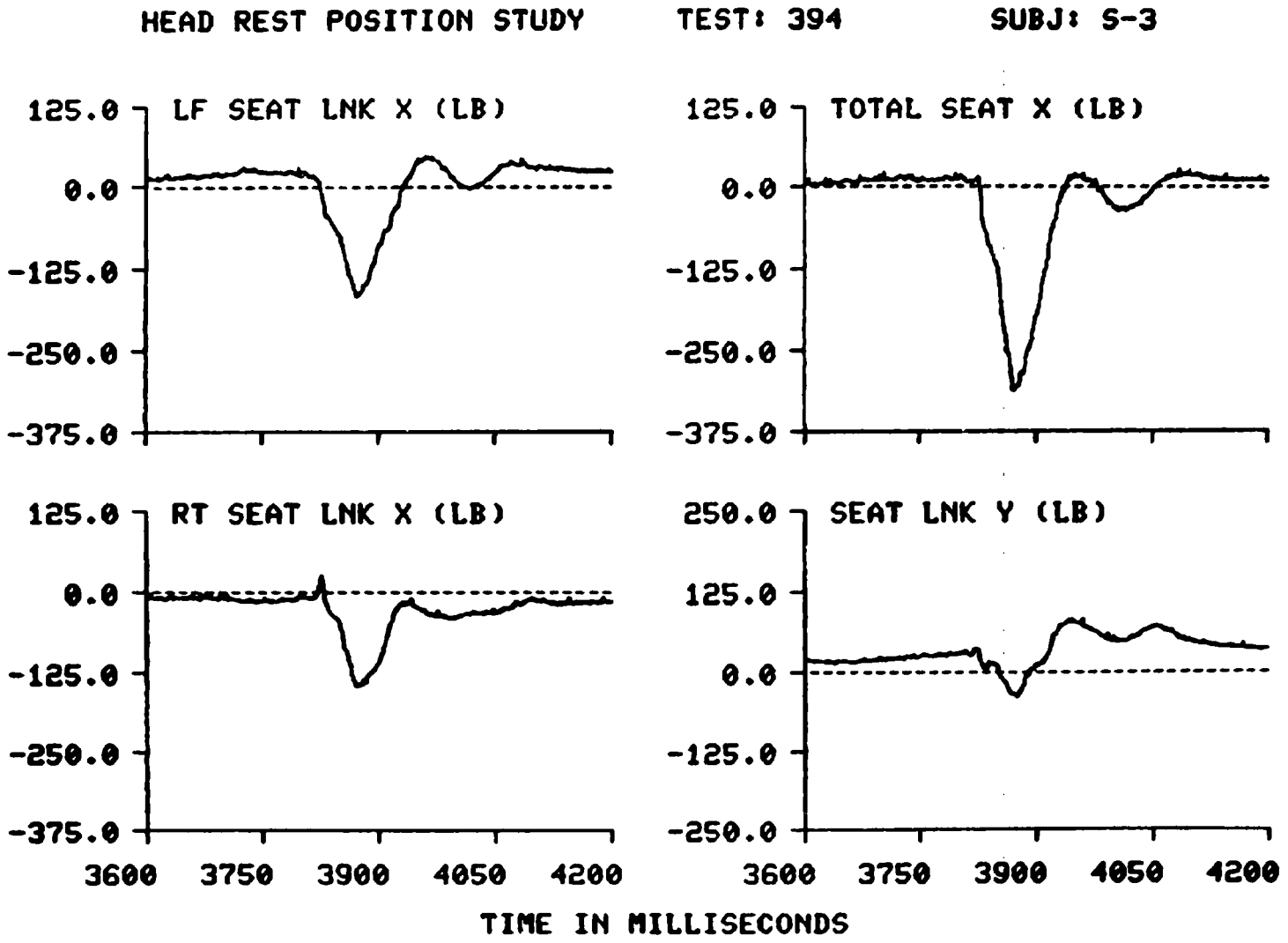

HEAD REST POSITION STUDY
TEST: 394
SUBJ: S-3
CHEST X (G)
30.0
20.0
10.0
0.0
-10.0
CHEST Z (G)
30.0
20.0
10.0
0.0
-10.0
CHEST Y (G)
30.0
20.0
10.0
0.0
-10.0
CHEST RES (G)
40.0
30.0
20.0
10.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

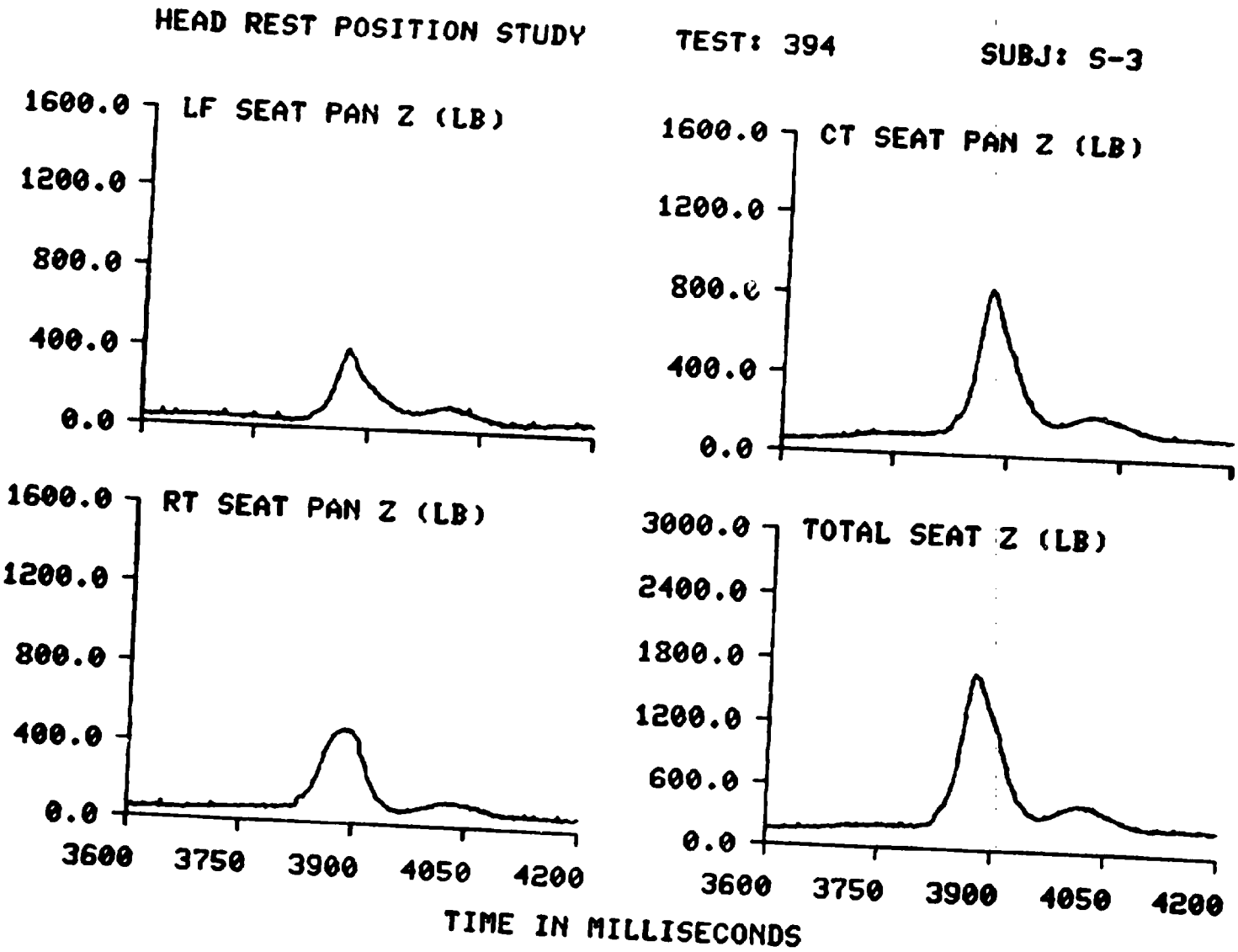

HEAD REST POSITION STUDY
TEST: 394
SUBJ: S-3
HEAD X (G)
20.0
15.0
10.0
5.0
0.0
-5.0
HEAD Z (G)
20.0
15.0
10.0
5.0
0.0
-5.0
HEAD Y (G)
20.0
15.0
10.0
5.0
0.0
-5.0
HEAD RES (G)
25.0
20.0
15.0
10.0
5.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

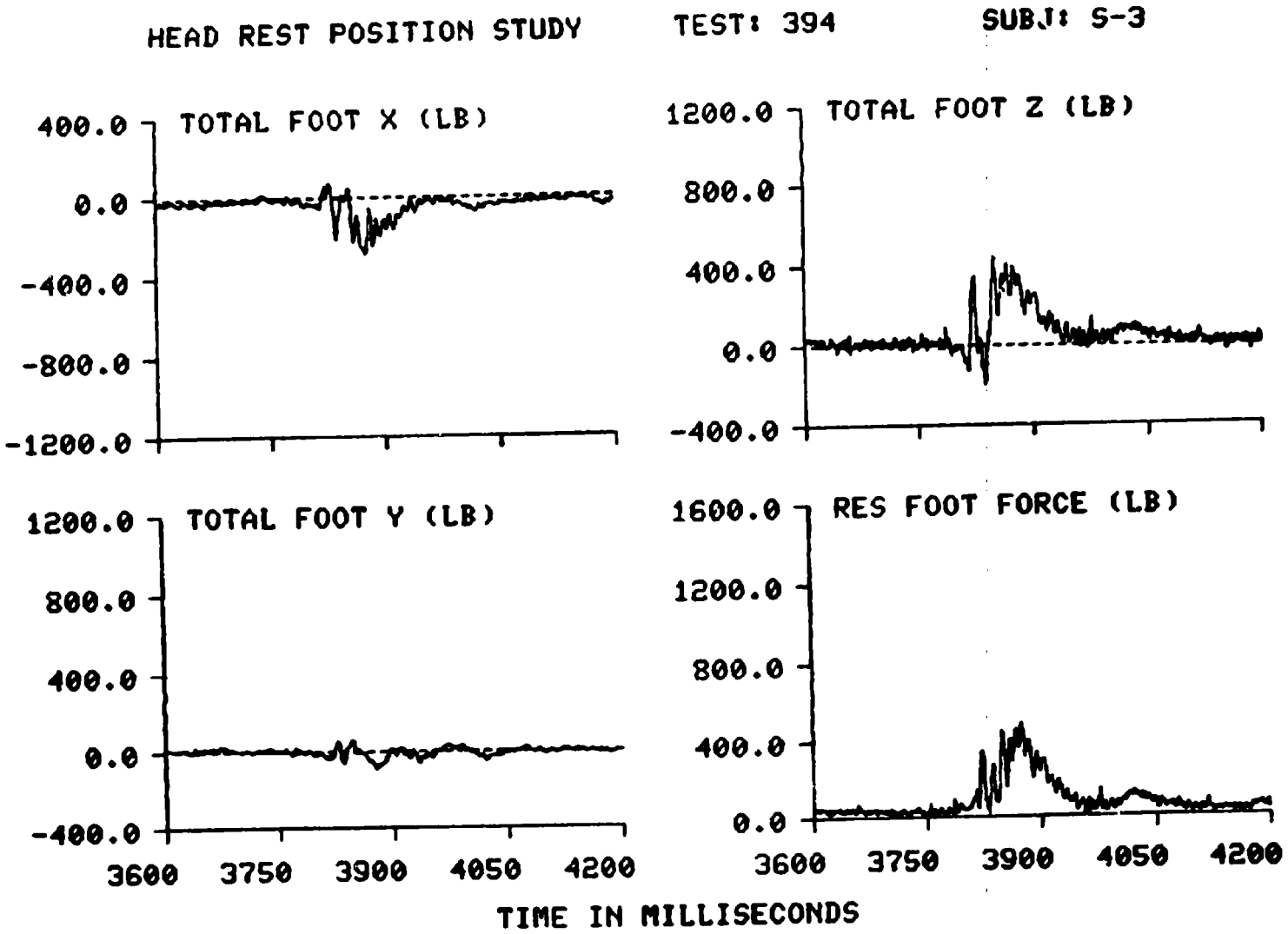

HEAD REST POSITION STUDY
TEST: 394
SUBJ: S-3
SHD REFL LF (LB)
SHD REFL RT (LB)
SHD REEL LF (LB)
SHD REEL RT (LB)
250.0
200.0
150.0
100.0
50.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 394
SUBJ: S-3
LF SHOULDER (LB)
300.0
225.0
150.0
75.0
0.0
RT SHOULDER (LB)
300.0
225.0
150.0
75.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 394
SUBJ: S-3
LF LAP BELT (LB)
CROTCH STRAP (LB)
RT LAP BELT (LB)
TOTAL LAP (LB)
250.0
200.0
150.0
100.0
50.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 394
SUBJ: S-3
LF SEAT LNK X (LB)
TOTAL SEAT X (LB)
RT SEAT LNK X (LB)
SEAT LNK Y (LB)
125.0
0.0
-125.0
-250.0
-375.0
250.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 394
SUBJ: S-3
LF SEAT PAN Z (LB)
1600.0
1200.0
800.0
400.0
0.0
CT SEAT PAN Z (LB)
1600.0
1200.0
800.0
400.0
0.0
RT SEAT PAN Z (LB)
1600.0
1200.0
800.0
400.0
0.0
TOTAL SEAT Z (LB)
3000.0
2400.0
1800.0
1200.0
600.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 394
SUBJ: S-3
TOTAL FOOT X (LB)
400.0
0.0
-400.0
-800.0
-1200.0
TOTAL FOOT Z (LB)
1200.0
800.0
400.0
0.0
-400.0
TOTAL FOOT Y (LB)
1200.0
800.0
400.0
0.0
-400.0
RES FOOT FORCE (LB)
1600.0
1200.0
800.0
400.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

HEAD REST POS STUDY TEST: 373 SUBJ: D-1 WT: 209.0 G: 10 GP: 1 CELL: D

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.06	9.96	3269.00	1975.00	48
CARRIAGE X	1.47	-1.03	3863.00	3849.00	36
CARRIAGE Y	0.82	-0.88	3878.00	3837.00	31
CARRIAGE Z	12.65	-0.34	3870.00	3655.00	1
CARRIAGE Z (SM)	10.61	-0.12	3870.00	3654.00	
CARRIAGE VEL	-0.89	-25.84	4180.00	3837.00	29
SEAT X	1.34	-1.71	3833.00	3849.00	32
SEAT Y	0.81	-0.91	3848.00	3883.00	33
SEAT Z	11.15	-0.31	3877.00	3684.00	34
SEAT Z (SM)	10.91	-0.20	3878.00	3683.00	
CHEST X	4.49	-1.67	3885.00	3924.00	5
CHEST Y	1.74	-2.42	3877.00	3947.00	6
CHEST Z	17.25	-0.90	3906.00	3685.00	7
CHEST RES	17.53	0.82	3906.00	3682.00	
CHEST SI	31.04		3835.00	3982.00	
HEAD X	1.93	-1.19	3881.00	3918.00	2
HEAD Y	1.73	0.24	3929.00	3879.00	3
HEAD Z	12.47	-1.06	3891.00	3704.00	4
HEAD RES	12.57	0.62	3891.00	3837.00	
HEAD SI	20.54		3843.00	3948.00	
HEAD HIC	17.86		3864.00	3926.00	
SHD REFL LF	47.1[illegible]	19.32	3907.00	3960.00	14
SHD REEL LF	44.60	4.11	3919.00	3879.00	16
LF SHOULDER	84.45	25.95	3916.00	3872.00	
SHD REFL RT	49.91	15.81	3913.00	3969.00	15
SHD REEL RT	43.07	2.36	3920.00	3884.00	17
RT SHOULDER	87.93	33.09	3920.00	3871.00	
TOTAL SHLD REFL	93.91	35.78	3912.00	3969.00	
TOTAL SHLD REEL	87.59	8.28	3920.00	3882.00	
TOTAL SHOULDER	171.12	59.34	3917.00	3871.00	
TOTAL SHD / WT	0.82	0.28	3917.00	3871.00	
LF LAP BELT	50.30	28.78	3977.00	3871.00	8
RT LAP BELT	41.58	16.54	4002.00	3906.00	9
TOTAL LAP	90.94	47.68	3986.00	3877.00	
TOTAL LAP / WT	0.44	0.23	3986.00	3877.00	
CROTCH STRAP	275.38	-16.41	3978.00	3898.00	10
LF SEAT LNK X	66.34	-135.69	4107.00	3886.00	18
RT SEAT LNK X	21.85	-98.97	3944.00	3886.00	19
TOTAL SEAT X	72.55	-234.66	3959.00	3886.00	
SEAT LNK Y	63.05	-59.83	3944.00	3883.00	35
LF SEAT PAN Z	509.19	33.46	3887.00	3600.00	11
RT SEAT PAN Z	538.68	43.03	3887.00	3605.00	12
CT SEAT PAN Z	1120.40	85.61	3890.00	3603.00	13
TOTAL SEAT Z	2157.95	168.46	3889.00	3604.00	
TOTAL SEAT Z / WT	10.33	0.81	3889.00	3604.00	
RES SEAT FORCE	2169.89	169.92	3889.00	3604.00	
RES SEAT FORCE / WT	10.38	0.81	3889.00	3604.00	
LF FOOT X	-7.03	-168.87	3832.00	3885.00	20
RT FOOT X	5.97	-159.69	3839.00	3888.00	23
CT FOOT X	-0.30	-206.91	3840.00	3887.00	26
TOTAL FOOT X	-4.98	-525.60	3840.00	3887.00	
LF FOOT Y	173.17	-32.97	3881.00	3849.00	21
RT FOOT Y	27.42	-163.38	3841.00	3872.00	24
CT FOOT Y	27.20	-44.89	3839.00	3876.00	27
TOTAL FOOT Y	77.11	-77.85	3841.00	3849.00	
LF FOOT Z	230.23	-46.75	3881.00	3849.00	22
RT FOOT Z	238.27	-3.43	3888.00	3977.00	25
CT FOOT Z	172.44	-116.78	3895.00	3851.00	28
TOTAL FOOT Z	815.05	-123.21	3880.00	3029.00	
RES FOOT FORCE	784.08	75.00	3889.00	3058.00	

HEAD REST POS STUDY TEST: 365 SUBJ: E-1 WT: 189.0 G: 10 GP: 2 CELL: D

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	239.00	980.00	48
CARRIAGE X	1.77	-1.28	3869.00	3857.00	36
CARRIAGE Y	0.06	-1.54	9635.00	3836.00	31
CARRIAGE Z	11.79	-0.24	9874.00	3772.00	1
CARRIAGE Z (SM)	10.25	-0.10	3876.00	3774.00	
CARRIAGE VEL	-1.03	-25.87	4199.00	3839.00	29
SEAT X	2.52	-1.66	3845.00	3856.00	32
SEAT Y	0.48	-1.07	3880.00	3902.00	33
SEAT Z	10.79	-0.31	3872.00	3606.00	34
SEAT Z (SM)	10.17	-0.21	3882.00	3699.00	
CHEST X	3.38	-2.39	3893.00	3933.00	5
CHEST Y	0.04	-2.23	3935.00	3892.00	6
CHEST Z	16.28	-2.77	3912.00	3981.00	7
CHEST RES	16.31	0.92	3912.00	4089.00	
CHEST SI	90.90		3841.00	4005.00	
HEAD X	5.83	-1.14	3893.00	3951.00	2
HEAD Y	2.04	-0.95	3954.00	3917.00	3
HEAD Z	12.40	-0.89	9901.00	3706.00	4
HEAD RES	13.57	0.21	3898.00	4173.00	
HEAD SI	21.83		9848.00	4005.00	
HEAD HIC	17.96		3870.00	3940.00	
SHD REFL LF	80.13	18.76	3924.00	3992.00	14
SHD REEL LF	74.50	4.14	3920.00	3883.00	16
LF SHOULDER	152.08	34.94	3921.00	3875.00	
SHD REFL RT	54.61	23.54	3922.00	3979.00	15
SHD REEL RT	93.04	14.03	3920.00	3885.00	17
RT SHOULDER	147.18	52.28	3921.00	3877.00	
TOTAL SHLD REFL	134.46	42.92	3923.00	3984.00	
TOTAL SHLD REEL	167.54	18.80	3920.00	3884.00	
TOTAL SHOULDER	289.27	87.98	3921.00	3876.00	
TOTAL SHD / WT	1.58	0.47	3921.00	3876.00	
LF LAP BELT	92.86	2.41	4005.00	3923.00	8
RT LAP BELT	43.10	16.26	3987.00	3878.00	9
TOTAL LAP	70.98	22.81	4005.00	3923.00	
TOTAL LAP / WT	0.98	0.12	4005.00	3923.00	
CROTCH STRAP	169.44	-56.03	3990.00	3898.00	10
LF SEAT LNK X	21.09	-174.61	3972.00	3889.00	18
RT SEAT LNK X	22.28	-197.31	3943.00	3890.00	19
TOTAL SEAT X	22.77	-311.30	4111.00	3889.00	
SEAT LNK Y	46.68	-54.40	3962.00	3900.00	35
LF SEAT PAN Z	436.80	36.90	3891.00	3620.00	11
RT SEAT PAN Z	538.13	52.04	3893.00	3616.00	12
CT SEAT PAN Z	1091.07	67.41	3900.00	3760.00	13
TOTAL SEAT Z	1967.38	169.46	3900.00	3613.00	
TOTAL SEAT Z / WT	10.41	0.90	3900.00	3613.00	
RES SEAT FORCE	1986.07	172.12	3900.00	3600.00	
RES SEAT FORCE / WT	10.51	0.91	3900.00	3600.00	
LF FOOT X	-13.07	-159.54	3844.00	3904.00	20
RT FOOT X	-3.60	-149.87	3844.00	3894.00	23
CT FOOT X	-1.14	-202.39	3844.00	3894.00	26
TOTAL FOOT X	-17.81	-501.85	3844.00	3894.00	
LF FOOT Y	159.27	-37.26	3886.00	3854.00	21
RT FOOT Y	21.12	-169.68	4108.00	3877.00	24
CT FOOT Y	26.82	-40.81	3867.00	3895.00	27
TOTAL FOOT Y	45.33	-96.51	3846.00	3896.00	
LF FOOT Z	213.36	-32.12	3886.00	3854.00	22
RT FOOT Z	209.63	14.01	3893.00	4179.00	25
CT FOOT Z	237.43	-100.25	3899.00	3856.00	28
TOTAL FOOT Z	578.46	-75.99	3868.00	3855.00	
RES FOOT FORCE	750.19	66.15	3894.00	4187.00	

HEAD REST POS STUDY TEST: 377 SUBJ: F-3 WT: 167.0 G: 10 SP: 1 CELL: 0

DATA ID	MAX	MIN	T1	T2	CH
IOV EXT PWR	10.05	9.97	494.00	496.00	48
CARRIAGE X	1.77	-1.23	3920.00	3913.00	36
CARRIAGE Y	0.85	-0.96	3919.00	4022.00	31
CARRIAGE Z	12.71	-0.22	3913.00	3726.00	1
CARRIAGE Z (SM)	10.80	-0.09	3913.00	3619.00	
CARRIAGE VEL	-1.09	-25.77	4197.00	3877.00	29
SEAT X	1.47	-1.68	3879.00	3912.00	32
SEAT Y	0.77	-1.05	3877.00	3889.00	33
SEAT Z	12.13	-0.22	3920.00	3699.00	34
SEAT Z (SM)	10.88	-0.09	3920.00	3747.00	
CHEST X	4.14	-2.31	3934.00	3961.00	5
CHEST Y	-0.36	-2.03	4002.00	3948.00	6
CHEST Z	16.65	-1.00	3946.00	3731.00	7
CHEST RES	16.79	1.21	3946.00	3699.00	
CHEST SI	29.83		3883.00	4002.00	
HEAD X	3.65	-0.27	3937.00	4196.00	2
HEAD Y	1.97	-0.19	4002.00	3941.00	3
HEAD Z	12.25	-1.39	3937.00	3774.00	4
HEAD RES	12.78	0.95	3937.00	4196.00	
HEAD SI	19.79		3893.00	3995.00	
HEAD HIC	17.14		3910.00	3974.00	
SHD REFL LF	67.88	22.14	3957.00	4047.00	14
SHD REEL LF	50.39	9.50	3957.00	3931.00	16
LF SHOULDER	118.27	46.65	3957.00	4030.00	
SHD REFL RT	78.03	33.42	3955.00	3987.00	15
SHD REEL RT	72.17	19.31	3955.00	3926.00	17
RT SHOULDER	150.20	77.73	3955.00	3925.00	
TOTAL SHLD REFL	145.78	61.19	3956.00	3997.00	
TOTAL SHLD REEL	122.11	29.69	3956.00	3927.00	
TOTAL SHOULDER	267.89	130.16	3956.00	4046.00	
TOTAL SHD / WT	1.60	0.78	3956.00	4046.00	
LF LAP BELT	64.77	21.71	4024.00	3922.00	8
RT LAP BELT	72.37	28.79	4020.00	3920.00	9
TOTAL LAP	135.46	49.30	4022.00	3921.00	
TOTAL LAP / WT	0.81	0.30	4022.00	3921.00	
CROTCH STRAP	95.59	-84.29	4021.00	3930.00	10
LF SEAT LNK X	48.97	-169.18	4007.00	3929.00	18
RT SEAT LNK X	92.24	-71.06	3635.00	3926.00	19
TOTAL SEAT X	69.90	-238.38	3722.00	3929.00	
SEAT LNK Y	61.33	-66.39	3991.00	3935.00	35
LF SEAT PAN Z	446.40	19.35	3935.00	3604.00	11
RT SEAT PAN Z	965.85	19.72	3939.00	3606.00	12
CT SEAT PAN Z	725.81	50.68	3930.00	3708.00	13
TOTAL SEAT Z	1515.37	101.64	3935.00	3604.00	
TOTAL SEAT Z / WT	9.07	0.61	3935.00	3604.00	
RES SEAT FORCE	1534.18	118.36	3935.00	3604.00	
RES SEAT FORCE / WT	9.19	0.71	3935.00	3604.00	
LF FOOT X	-40.13	-189.31	3881.00	3929.00	20
RT FOOT X	-4.92	-149.43	3880.00	3914.00	23
CT FOOT X	-80.89	-232.94	4190.00	3931.00	26
TOTAL FOOT X	-147.17	-555.48	3881.00	3914.00	
LF FOOT Y	162.99	-27.43	3914.00	4000.00	21
RT FOOT Y	22.36	-184.41	3823.00	3914.00	24
CT FOOT Y	25.27	-46.81	4022.00	3926.00	27
TOTAL FOOT Y	83.07	-91.09	3962.00	3931.00	
LF FOOT Z	291.42	22.61	3915.00	4000.00	22
RT FOOT Z	230.84	43.29	3941.00	3910.00	25
CT FOOT Z	192.61	-114.72	3920.00	3872.00	28
TOTAL FOOT Z	508.57	-1.10	3923.00	3872.00	
RES FOOT FORCE	719.87	186.96	3915.00	4200.00	

HEAD REST POS STUDY TEST: 402 SUBJ: F-2 WT: 160.0 G: 10 GP: 1 CELL: D

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.86	270.00	2807.00	48
CARRIAGE X	1.21	-1.00	3921.00	3914.00	36
CARRIAGE Y	0.69	-0.80	3920.00	3868.00	31
CARRIAGE Z	12.44	-0.29	3914.00	3685.00	1
CARRIAGE Z (SM)	10.68	-0.11	3915.00	3684.00	
CARRIAGE VEL	-1.12	-25.89	4194.00	3875.00	29
SEAT X	1.55	-1.37	3877.00	3914.00	32
SEAT Y	0.59	-1.95	3877.00	3890.00	33
SEAT Z	11.97	-0.37	3921.00	3895.00	34
SEAT Z (SM)	10.74	-0.18	3922.00	3894.00	
CHEST X	4.31	-1.78	3938.00	3967.00	5
CHEST Y	-0.60	-2.68	4082.00	3941.00	6
CHEST Z	17.94	-1.19	3942.00	4017.00	7
CHEST RES	17.88	0.87	3942.00	3738.00	
CHEST SI	93.20		3877.00	4009.00	
HEAD X	2.50	-2.77	3940.00	3960.00	2
HEAD Y	0.88	-1.19	4026.00	3943.00	3
HEAD Z	13.41	-1.09	3938.00	3668.00	4
HEAD RES	13.69	0.63	3940.00	4195.00	
HEAD SI	21.22		3887.00	3989.00	
HEAD HIC	17.90		3914.00	3971.00	
SHD REFL LF	53.53	14.97	3956.00	4003.00	14
SHD REEL LF	48.41	9.10	3961.00	3927.00	16
LF SHOULDER	99.77	35.66	3960.00	4028.00	
SHD REFL RT	59.54	19.92	3956.00	4010.00	15
SHD REEL RT	64.61	5.92	3959.00	3925.00	17
RT SHOULDER	123.50	37.51	3959.00	4028.00	
TOTAL SHLD REFL	113.07	35.19	3956.00	4002.00	
TOTAL SHLD REEL	112.21	15.28	3960.00	3926.00	
TOTAL SHOULDER	223.05	73.17	3958.00	4028.00	
TOTAL SHD / WT	1.39	0.46	3959.00	4028.00	
LF LAP BELT	47.86	15.21	4022.00	3923.00	8
RT LAP BELT	55.62	29.89	4028.00	3924.00	9
TOTAL LAP	102.43	45.16	4024.00	3923.00	
TOTAL LAP / WT	0.64	0.28	4024.00	3923.00	
CROTCH STRAP	122.55	-57.07	4029.00	3938.00	10
LF SEAT LNK X	28.02	-215.61	4172.00	3935.00	18
RT SEAT LNK X	14.80	-119.01	3688.00	3936.00	19
TOTAL SEAT X	25.20	-332.76	3688.00	3935.00	
SEAT LNK Y	48.19	-80.13	4011.00	3934.00	35
LF SEAT PAN Z	517.85	20.87	3937.00	3665.00	11
RT SEAT PAN Z	468.51	14.69	3938.00	3620.00	12
CT SEAT PAN Z	847.55	28.73	3938.00	3616.00	13
TOTAL SEAT Z	1632.70	80.02	3938.00	3619.00	
TOTAL SEAT Z / WT	10.20	0.50	3938.00	3619.00	
RES SEAT FORCE	1667.59	85.16	3938.00	3619.00	
RES SEAT FORCE / WT	10.42	0.53	3938.00	3619.00	
LF FOOT X	-0.22	-90.63	3880.00	3929.00	20
RT FOOT X	-5.76	-128.25	3879.00	3932.00	23
CT FOOT X	-23.76	-169.55	4171.00	3929.00	26
TOTAL FOOT X	-93.32	-387.52	3879.00	3932.00	
LF FOOT Y	124.75	-31.60	3917.00	3887.00	21
RT FOOT Y	29.27	-162.20	3612.00	3925.00	24
CT FOOT Y	64.17	-7.92	3952.00	3997.00	27
TOTAL FOOT Y	58.48	-57.37	3886.00	3925.00	
LF FOOT Z	195.12	17.25	3918.00	4131.00	22
RT FOOT Z	187.52	18.48	3925.00	4145.00	25
CT FOOT Z	228.51	-78.41	3922.00	3872.00	28
TOTAL FOOT Z	545.01	-8.99	3925.00	3872.00	
RES FOOT FORCE	807.72	88.34	3925.00	4161.00	

HEAD REST POS STUDY TEST: 368 SUBJ: G-3 WT: 161.0 G: 10 GP: 2 CELL: D

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	1572.00	2454.00	48
CARRIAGE X	1.15	-1.09	3910.00	3898.00	36
CARRIAGE Y	0.84	-0.59	3926.00	3897.00	31
CARRIAGE Z	12.26	-0.31	3917.00	3827.00	1
CARRIAGE Z (SM)	10.47	-0.13	3917.00	3685.00	
CARRIAGE VEL	-0.90	-25.70	4176.00	3868.00	29
SEAT X	1.84	-1.06	3083.00	3930.00	32
SEAT Y	0.68	-0.97	3882.00	3903.00	33
SEAT Z	11.39	-0.23	3923.00	3808.00	34
SEAT Z (SM)	10.48	-0.17	3924.00	3730.00	
CHEST X	1.49	-3.44	3891.00	3971.00	5
CHEST Y	0.41	-3.24	3926.00	3957.00	6
CHEST Z	17.63	-1.	3957.00	3731.00	7
CHEST RES	18.01	0.	3957.00	4173.00	
CHEST SI	29.44		3883.00	4027.00	
HEAD X	2.59	-3.24	4015.00	3974.00	2
HEAD Y	1.99	-0.55	4034.00	3967.00	3
HEAD Z	11.85	-1.71	3940.00	4025.00	4
HEAD RES	11.91	0.82	3940.00	4199.00	
HEAD SI	20.05		3891.00	3999.00	
HEAD HIC	17.62		3913.00	3981.00	
SHD REEL LF	79.85	15.34	3969.00	4031.00	14
SHD REEL LF	59.34	7.54	3963.00	3919.00	16
LF SHOULDER	135.80	31.86	3963.00	4021.00	
SHD REEL RT	62.19	21.80	3966.00	4046.00	15
SHD REEL RT	65.54	3.50	3968.00	3924.00	17
RT SHOULDER	127.20	34.29	3966.00	3920.00	
TOTAL SHLD REEL	140.96	88.28	3967.00	4046.00	
TOTAL SHLD REEL	123.58	11.64	3963.00	3936.00	
TOTAL SHOULDER	261.91	74.79	3964.00	3919.00	
TOTAL SHD / WT	1.63	0.46	3964.00	3919.00	
LF LAP BELT	38.31	6.68	4039.00	3917.00	8
RT LAP BELT	59.45	13.84	4036.00	3923.00	9
TOTAL LAP	97.58	21.70	4039.00	3924.00	
TOTAL LAP / WT	0.61	0.13	4039.00	3924.00	
CROTCH STRAP	175.59	-20.49	4029.00	3941.00	10
LF SEAT LNK X	35.24	-134.56	4193.00	3932.00	18
RT SEAT LNK X	20.29	-100.95	3883.00	3939.00	19
TOTAL SEAT X	42.48	-229.75	3734.00	3939.00	
SEAT LNK Y	43.78	-56.70	4007.00	3945.00	35
LF SEAT PAN Z	602.52	48.27	3940.00	3616.00	11
RT SEAT PAN Z	640.25	30.73	3941.00	3623.00	12
CT SEAT PAN Z	464.19	24.11	3942.00	3602.00	13
TOTAL SEAT Z	1696.38	118.38	3941.00	3610.00	
TOTAL SEAT Z / WT	10.54	0.74	3941.00	3610.00	
RES SEAT FORCE	1711.49	123.15	3941.00	3610.00	
RES SEAT FORCE / WT	10.63	0.76	3941.00	3610.00	
LF FOOT X	3.44	-109.58	3885.00	3929.00	20
RT FOOT X	18.22	-96.33	3886.00	3935.00	23
CT FOOT X	26.05	-127.78	3884.00	3931.00	26
TOTAL FOOT X	41.46	-322.22	3886.00	3929.00	
LF FOOT Y	137.33	-21.64	3928.00	4000.00	21
RT FOOT Y	28.24	-134.16	3971.00	3937.00	24
CT FOOT Y	17.39	-40.46	3956.00	3936.00	27
TOTAL FOOT Y	41.96	-82.37	3971.00	3938.00	
LF FOOT Z	142.23	-38.82	3920.00	3697.00	22
RT FOOT Z	185.42	-8.27	3928.00	3870.00	25
CT FOOT Z	154.61	-81.38	3923.00	3897.00	28
TOTAL FOOT Z	436.65	-98.63	3928.00	3877.00	
RES FOOT FORCE	528.17	53.80	3928.00	4031.00	

HEAD REST POS STUDY TEST: 374 SUBJ: G-2 WT: 121.0 G: 10 GP: 2 CELL: D

DATA ID	MAX	MIN	T1	T2	CH
IOV EXT PWR	10.05	9.97	955.00	1647.00	48
CARRIAGE X	1.22	-0.86	3815.00	3852.00	36
CARRIAGE Y	0.99	-0.77	3871.00	3836.00	31
CARRIAGE Z	12.49	-0.38	3852.00	3773.00	1
CARRIAGE Z (SM)	10.70	-0.09	3853.00	3637.00	
CARRIAGE VEL	-1.05	-25.76	4153.00	3819.00	29
SEAT X	1.70	-1.57	3816.00	3866.00	32
SEAT Z	0.72	-0.91	3869.00	3885.00	33
SEAT Z	11.76	-0.30	3859.00	3671.00	34
SEAT Z (SM)	10.69	-0.18	3859.00	3670.00	
CHEST X	9.30	-0.72	3869.00	3927.00	5
CHEST Y	-0.26	-1.72	3852.00	3954.00	6
CHEST Z	15.20	-1.25	3890.00	3772.00	7
CHEST RES	15.22	0.88	3890.00	4198.00	
CHEST SI	22.62		3817.00	3966.00	
HEAD X	1.08	-1.97	3860.00	3893.00	2
HEAD Y	0.79	-1.18	3776.00	3877.00	3
HEAD Z	12.66	-0.87	3875.00	3810.00	4
HEAD RES	12.72	0.48	3875.00	3815.00	
HEAD SI	18.58		3823.00	3942.00	
HEAD HIC	15.67		3846.00	3913.00	
SHD REFL LF	45.86	12.29	3880.00	3959.00	14
SHD REEL LF	95.05	6.24	3897.00	3860.00	16
LF SHOULDER	79.46	29.12	3896.00	3976.00	
SHD REFL RT	35.25	16.14	3885.00	3999.00	15
SHD REEL RT	42.58	6.48	3900.00	3873.00	17
RT SHOULDER	72.48	33.80	3899.00	4008.00	
TOTAL SHLD REFL	79.75	35.15	3880.00	4097.00	
TOTAL SHLD REEL	76.91	14.82	3899.00	3873.00	
TOTAL SHOULDER	149.99	65.15	3897.00	3985.00	
TOTAL SHD / WT	1.24	0.54	3897.00	3985.00	
LF LAP BELT	40.48	12.44	3943.00	3857.00	8
RT LAP BELT	39.71	15.94	3943.00	3861.00	9
TOTAL LAP	80.19	29.16	3943.00	3858.00	
TOTAL LAP / WT	0.66	0.24	3943.00	3858.00	
CROTCH STRAP	99.54	-23.52	3945.00	3873.00	10
LF SEAT LNK X	39.01	-136.54	3963.00	3867.00	18
RT SEAT LNK X	51.74	-22.49	3818.00	3866.00	19
TOTAL SEAT X	56.81	-157.80	3792.00	3867.00	
SEAT LNK Y	64.33	-28.88	3929.00	3863.00	35
LF SEAT PAN Z	385.05	30.81	3869.00	3617.00	11
RT SEAT PAN Z	358.50	25.41	3869.00	3632.00	12
CT SEAT PAN Z	621.22	45.30	3877.00	3625.00	13
TOTAL SEAT Z	1346.44	114.56	3869.00	3630.00	
TOTAL SEAT Z / WT	11.13	0.95	3869.00	3630.00	
RES SEAT FORCE	1354.76	119.56	3869.00	3630.00	
RES SEAT FORCE / WT	11.20	0.99	3869.00	3630.00	
LF FOOT X	21.61	-48.91	3820.00	3866.00	20
RT FOOT X	11.40	-131.35	3818.00	3866.00	23
CT FOOT X	38.65	-101.98	3818.00	3867.00	26
TOTAL FOOT X	65.14	-279.56	3818.00	3866.00	
LF FOOT Y	86.47	-15.72	3863.00	3933.00	21
RT FOOT Y	22.31	-127.67	3833.00	3863.00	24
CT FOOT Y	39.98	-14.31	3882.00	3823.00	27
TOTAL FOOT Y	47.80	-56.61	3834.00	3824.00	
LF FOOT Z	127.62	-24.57	3855.00	3827.00	22
RT FOOT Z	152.72	-11.46	3864.00	3833.00	25
CT FOOT Z	133.46	-72.04	3863.00	3809.00	28
TOTAL FOOT Z	392.13	-62.00	3863.00	3802.00	
RES FOOT FORCE	444.92	10.84	3864.00	4182.00	

HEAD REST F IS STUDY TEST: 356 SUBJ: K-1 WT: 174.0 G: 10 GP: 2 CELL: D

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	2643.00	714.00	48
CARRIAGE X	1.44	-1.06	3886.00	3894.00	36
CARRIAGE Y	0.61	-0.80	3886.00	3984.00	31
CARRIAGE Z	12.29	-0.20	3879.00	3703.00	1
CARRIAGE Z (SM)	10.67	-0.10	3895.00	3668.00	
CARRIAGE VEL	-0.93	-25.80	4173.00	3848.00	29
SEAT X	1.24	-1.49	3886.00	3893.00	32
SEAT Y	0.80	-0.61	3984.00	3851.00	33
SEAT Z	11.07	-0.35	3885.00	3713.00	34
SEAT Z (SM)	10.48	-0.20	3886.00	3713.00	
CHEST X	4.87	-2.35	3902.00	3941.00	5
CHEST Y	0.48	-1.65	3932.00	3990.00	6
CHEST Z	21.91	-1.38	3908.00	3983.00	7
CHEST RES	21.57	0.87	3908.00	3733.00	
CHEST SI	39.32		3845.00	3894.00	
HEAD X	0.97	-5.14	4003.00	3939.00	2
HEAD Y	1.35	-1.30	3981.00	3902.00	3
HEAD Z	11.77	-1.52	3904.00	3600.00	4
HEAD RES	11.84	0.77	3904.00	4177.00	
HEAD SI	18.54		3863.00	3954.00	
HEAD HIC	16.10		3878.00	3944.00	
SHD REFL LF	47.29	13.93	3933.00	3989.00	14
SHD REEL LF	51.18	3.60	3937.00	3881.00	16
LF SHOULDER	96.48	27.44	3936.00	3881.00	
SHD REFL RT	56.42	17.83	3918.00	3993.00	15
SHD REEL RT	62.53	4.35	3927.00	3881.00	17
RT SHOULDER	117.11	38.86	3926.00	3881.00	
TOTAL SHLD REFL	99.04	32.71	3925.00	3989.00	
TOTAL SHLD REEL	102.73	7.95	3936.00	3881.00	
TOTAL SHOULDER	199.08	66.31	3930.00	3881.00	
TOTAL SHD / WT	1.14	0.38	3930.00	3881.00	
LF LAP BELT	54.42	23.88	3994.00	4075.00	8
RT LAP BELT	62.78	22.82	3988.00	4068.00	9
TOTAL LAP	115.72	48.42	3993.00	4067.00	
TOTAL LAP / WT	0.67	0.28	3993.00	4067.00	
CROTCH STRAP	199.22	-36.08	3998.00	3901.00	10
LF SEAT LNK X	22.92	-206.74	4161.00	3895.00	18
RT SEAT LNK X	11.08	-148.50	3681.00	3895.00	19
TOTAL SEAT X	20.10	-355.24	3626.00	3895.00	
SEAT LNK Y	29.73	-81.04	3967.00	3887.00	35
LF SEAT PAN Z	697.21	43.58	3905.00	3629.00	11
RT SEAT PAN Z	702.67	38.86	3906.00	3616.00	12
CT SEAT PAN Z	589.59	32.24	3906.00	3660.00	13
TOTAL SEAT Z	1980.32	130.41	3905.00	3615.00	
TOTAL SEAT Z / WT	11.38	0.75	3905.00	3615.00	
RES SEAT FORCE	2010.67	130.98	3905.00	3615.00	
RES SEAT FORCE / WT	11.56	0.75	3905.00	3615.00	
LF FOOT X	16.56	-98.28	3839.00	3898.00	20
RT FOOT X	2.08	-130.10	4164.00	3897.00	23
CT FOOT X	17.80	-126.89	3843.00	3898.00	26
TOTAL FOOT X	16.95	-353.63	3839.00	3897.00	
LF FOOT Y	125.03	-15.60	3881.00	4044.00	21
RT FOOT Y	18.45	-133.19	4096.00	3881.00	24
CT FOOT Y	21.52	-29.21	3939.00	3902.00	27
TOTAL FOOT Y	29.19	-50.15	4000.00	3912.00	
LF FOOT Z	136.14	-20.78	3882.00	3829.00	22
RT FOOT Z	198.17	-8.07	3882.00	3987.00	25
CT FOOT Z	210.89	-45.59	3903.00	3994.00	28
TOTAL FOOT Z	489.99	-37.04	3883.00	3994.00	
RES FOOT FORCE	521.76	15.23	3883.00	4158.00	

HEAD REST POS STUDY TEST: 428 SUBJ: M-2 WT: 163.0 G: 10 GP: 1 CELL: D

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.04	9.96	155.00	938.00	48
CARRIAGE X	1.10	-0.89	3923.00	3916.00	36
CARRIAGE Y	1.11	-0.85	3926.00	3899.00	31
CARRIAGE Z	12.64	-0.26	3917.00	3739.00	1
CARRIAGE Z (SM)	10.50	-0.08	3917.00	3739.00	
CARRIAGE VEL	-1.28	-25.49	4200.00	3882.00	29
SEAT X	0.84	-1.10	3881.00	3916.00	32
SEAT Y	0.83	-1.09	3900.00	3889.00	33
SEAT Z	11.70	-0.32	3924.00	3747.00	34
SEAT Z (SM)	10.70	-0.13	3924.00	3748.00	
CHEST X	1.54	-3.39	3932.00	3974.00	5
CHEST Y	-0.06	-1.95	3971.00	4010.00	6
CHEST Z	20.59	-0.90	3950.00	3620.00	7
CHEST RES	20.66	0.98	3950.00	3650.00	
CHEST SI	37.20		3881.00	4018.00	
HEAD X	1.51	-4.15	3942.00	3974.00	2
HEAD Y	1.16	-1.18	4024.00	3955.00	3
HEAD Z	11.82	-0.89	3940.00	3612.00	4
HEAD RES	11.81	0.52	3940.00	4186.00	
HEAD SI	18.25		3891.00	4026.00	
HEAD HIC	16.43		3912.00	3983.00	
SHD REFL LF	80.88	26.77	3963.00	4018.00	14
SHD REEL LF	51.35	8.54	3967.00	3331.00	16
LF SHOULDER	111.75	40.19	3967.00	3920.00	
SHD REFL RT	42.78	25.88	3950.00	4002.00	15
SHD REEL RT	74.21	6.57	3964.00	3930.00	17
RT SHOULDER	114.05	42.17	3964.00	3930.00	
TOTAL SHLD REFL	101.27	54.87	3961.00	4018.00	
TOTAL SHLD REEL	124.42	15.19	3965.00	3930.00	
TOTAL SHOULDER	225.05	83.15	3965.00	3920.00	
TOTAL SHD / WT	1.38	0.51	3965.00	3920.00	
LF LAP BELT	35.46	7.16	4033.00	3925.00	8
RT LAP BELT	68.44	27.63	4025.00	3920.00	9
TOTAL LAP	103.92	36.92	4025.00	3926.00	
TOTAL LAP / WT	0.64	0.23	4025.00	3926.00	
CROTCH STRAP	91.67	-74.10	4029.00	3940.00	10
LF SEAT LNK X	43.86	-125.36	4026.00	3932.00	18
RT SEAT LNK X	23.31	-115.87	3609.00	3939.00	19
TOTAL SEAT X	48.19	-235.05	4007.00	3932.00	
SEAT LNK Y	62.65	-19.07	4006.00	3939.00	35
LF SEAT PAN Z	955.94	35.11	3940.00	3606.00	11
RT SEAT PAN Z	507.80	31.32	3943.00	3650.00	12
CT SEAT PAN Z	840.93	62.37	3941.00	3636.00	13
TOTAL SEAT Z	1696.52	146.93	3940.00	3600.00	
TOTAL SEAT Z / WT	10.41	0.90	3940.00	3600.00	
RES SEAT FORCE	1711.98	153.56	3940.00	3600.00	
RES SEAT FORCE / WT	10.50	0.94	3940.00	3600.00	
LF FOOT X	0.98	-83.11	3884.00	3936.00	20
RT FOOT X	-20.11	-167.26	4161.00	3946.00	23
CT FOOT X	-33.09	-187.83	4185.00	3836.00	26
TOTAL FOOT X	-76.30	-436.44	3883.00	3936.00	
LF FOOT Y	115.93	-33.44	3937.00	3889.00	21
RT FOOT Y	17.55	-175.02	4144.00	3928.00	24
CT FOOT Y	59.83	-8.01	3899.00	4002.00	27
TOTAL FOOT Y	39.55	-71.01	3954.00	3927.00	
LF FOOT Z	188.41	14.42	3921.00	3876.00	22
RT FOOT Z	223.51	8.47	3928.00	4027.00	25
CT FOOT Z	166.28	-58.23	3926.00	4001.00	28
TOTAL FOOT Z	523.15	9.49	3921.00	4174.00	
RES FOOT FORCE	644.02	96.86	3936.00	4174.00	

HEAD REST POS STUDY TEST: 993 SUBJ: M11 WT: 155.0 G: 10 GP: 1 CELL: D

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR					
CARRIAGE X	10.06	9.97	1120.00	3319.00	48
CARRIAGE Y	1.33	-0.80	3881.00	3851.00	36
CARRIAGE Z	0.51	-0.70	3881.00	3825.00	31
CARRIAGE Z (SM)	12.04	-0.21	3874.00	3641.00	1
CARRIAGE VEL	10.50	-0.09	3875.00	3675.00	
SEAT X	-1.10	-25.59	4200.00	3839.00	29
SEAT Y	1.33	-1.14	3844.00	3850.00	32
SEAT Z	0.66	-1.09	4010.00	3902.00	33
SEAT Z (SM)	11.47	-0.20	3882.00	3701.00	34
CHEST X	10.62	-0.13	3882.00	3699.00	
CHEST Y	3.49	-3.28	3907.00	3927.00	5
CHEST Z	0.57	-1.84	3919.00	3947.00	6
CHEST RES	23.72	-1.76	3904.00	3885.00	7
CHEST SI	23.92	0.67	3904.00	4155.00	
HEAD X	38.30		3839.00	3968.00	
HEAD Y	3.43	-0.83	3896.00	3950.00	2
HEAD Z	0.99	-1.60	3960.00	3901.00	3
HEAD RES	14.40	-0.93	3900.00	3668.00	4
HEAD SI	14.84	0.39	3900.00	4124.00	
HEAD HIC	28.10		3849.00	3957.00	
SHD REFL LF	19.15		3876.00	3924.00	
SHD REEL LF	61.00	14.47	3915.00	3964.00	14
LF SHOULDER	45.08	6.04	3922.00	3881.00	16
SHD REFL RT	101.35	33.29	3919.00	3964.00	
SHD REEL RT	47.31	16.19	3918.00	3971.00	15
RT SHOULDER	55.49	7.27	3924.00	3885.00	17
TOTAL SHLD REFL	98.14	32.10	3923.00	3956.00	
TOTAL SHLD REEL	107.28	30.95	3916.00	3964.00	
TOTAL SHOULDER	99.87	14.58	3924.00	3883.00	
TOTAL SHD / WT	197.59	69.70	3922.00	3962.00	
LF LAP BELT	1.27	0.45	3922.00	3962.00	
RT LAP BELT	37.48	5.58	3994.00	3884.00	8
TOTAL LAP	44.47	11.83	4000.00	3879.00	9
TOTAL LAP / WT	80.59	18.37	3995.00	3878.00	
CROTCH STRAP	0.52	0.12	3995.00	3878.00	
LF SEAT LNK X	98.55	-22.12	3984.00	3891.00	10
RT SEAT LNK X	38.20	-182.26	4118.00	3893.00	18
TOTAL SEAT X	25.17	-123.90	3844.00	3894.00	19
SEAT LNK Y	92.75	-305.53	3667.00	3895.00	
LF SEAT PAN Z	54.92	-80.66	3947.00	3901.00	35
RT SEAT PAN Z	505.28	27.47	3899.00	3628.00	11
CT SEAT PAN Z	528.51	23.72	3897.00	3607.00	12
TOTAL SEAT Z	725.58	31.40	3898.00	3629.00	13
TOTAL SEAT Z / WT	1754.04	90.42	3899.00	3607.00	
RES SEAT FORCE	11.32	0.63	3899.00	3607.00	
RES SEAT FORCE / WT	1779.36	102.67	3899.00	3630.00	
LF FOOT X	11.48	0.66	3899.00	3630.00	
RT FOOT X	-3.49	-140.01	3841.00	3892.00	20
CT FOOT X	26.42	-101.35	3839.00	3903.00	23
TOTAL FOOT X	18.21	-141.89	3841.00	3893.00	26
LF FOOT Y	34.97	-375.30	3841.00	3893.00	
RT FOOT Y	125.05	-20.82	3876.00	3851.00	21
CT FOOT Y	17.07	-127.58	3946.00	3886.00	24
TOTAL FOOT Y	28.02	-55.64	3843.00	3888.00	27
LF FOOT Z	51.82	-73.31	3928.00	3905.00	
RT FOOT Z	153.53	-11.45	3879.00	3832.00	22
CT FOOT Z	202.88	-5.45	3903.00	4011.00	25
TOTAL FOOT Z	117.44	-75.71	3915.00	3855.00	28
RES FOOT FORCE	385.85	-75.50	3904.00	3833.00	
	590.18	22.27	3903.00	4001.00	

HEAD REST POS STUDY TEST: 418 SUBJ: M10 WT: 140.0 G: 10 GP: 2 CELL: D

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.04	9.96	332.00	2953.00	48
CARRIAGE X	1.56	-1.03	3843.00	3813.00	96
CARRIAGE Y	1.09	-0.16	3844.00	3890.00	31
CARRIAGE Z	12.66	-0.19	3836.00	3648.00	1
CARRIAGE Z (SM)	10.69	-0.08	3836.00	3606.00	
CARRIAGE VEL	-1.02	-25.45	4167.00	3811.00	29
SEAT X	1.92	-1.43	3805.00	3811.00	32
SEAT Y	0.52	-0.65	3855.00	3808.00	99
SEAT Z	11.64	-0.28	3843.00	3638.00	34
SEAT Z (SM)	10.78	-0.12	3843.00	3639.00	
CHEST X	5.70	-1.51	3858.00	3886.00	5
CHEST Y	-0.44	-1.81	3882.00	3909.00	6
CHEST Z	18.16	-1.04	3868.00	3651.00	7
CHEST RES	18.36	1.19	3868.00	3636.00	
CHEST SI	31.53		3799.00	3940.00	
HEAD X	2.73	-1.13	3858.00	3881.00	2
HEAD Y	1.08	-0.87	3939.00	3053.00	3
HEAD Z	14.19	-1.06	3852.00	3866.00	4
HEAD RES	14.43	0.58	3853.00	4033.00	
HEAD SI	22.43		3811.00	3938.00	
HEAD HIC	17.68		3831.00	3879.00	
SHD REFL LF	33.72	6.77	3875.00	4094.00	14
SHD REEL LF	26.79	8.10	3958.00	3930.00	16
LF SHOULDER	48.13	17.98	3885.00	3934.00	
SHD REFL RT	60.88	27.75	3874.00	4054.00	15
SHD REEL RT	59.54	10.40	3882.00	3852.00	17
RT SHOULDER	114.91	49.72	3877.00	3982.00	
TOTAL SHLD REFL	94.47	35.93	3875.00	4094.00	
TOTAL SHLD REEL	77.63	20.03	3882.00	3837.00	
TOTAL SHOULDER	161.14	75.37	3876.00	3983.00	
TOTAL SHD / WT	1.15	0.54	3876.00	3983.00	
LF LAP BELT	38.61	8.43	3947.00	3845.00	8
RT LAP BELT	47.63	12.97	3947.00	3847.00	9
TOTAL LAP	86.44	22.07	3947.00	3846.00	
TOTAL LAP / WT	0.62	0.16	3947.00	3846.00	
CROTCH STRAP	34.27	-67.85	3941.00	3852.00	10
LF SEAT LNK X	40.52	-184.54	3939.00	3850.00	18
RT SEAT LNK X	40.14	-76.14	3806.00	3850.00	19
TOTAL SEAT X	34.34	-260.68	4141.00	3850.00	
SEAT LNK Y	53.85	-90.82	3917.00	3848.00	35
LF SEAT PAN Z	435.70	7.17	3851.00	3641.00	11
RT SEAT PAN Z	340.09	1.45	3852.00	3679.00	12
CT SEAT PAN Z	821.13	36.72	3854.00	3673.00	13
TOTAL SEAT Z	1586.21	65.94	3854.00	3631.00	
TOTAL SEAT Z / WT	11.33	0.47	3854.00	3631.00	
RES SEAT FORCE	1607.30	72.75	3854.00	3631.00	
RES SEAT FORCE / WT	11.48	0.52	3854.00	3631.00	
LF FOOT X	9.74	-147.25	3804.00	3855.00	20
RT FOOT X	26.51	-74.83	3802.00	3854.00	23
CT FOOT X	55.76	-170.53	3803.00	3855.00	26
TOTAL FOOT X	80.65	-387.19	3803.00	3854.00	
LF FOOT Y	150.13	-20.19	3838.00	3791.00	21
RT FOOT Y	27.17	-118.37	3894.00	3847.00	24
CT FOOT Y	26.72	-55.16	3801.00	3844.00	27
TOTAL FOOT Y	55.08	-51.07	3875.00	3868.00	
LF FOOT Z	181.56	-17.88	3838.00	3792.00	22
RT FOOT Z	103.13	-8.48	3839.00	3774.00	25
CT FOOT Z	158.52	-72.85	3802.00	3794.00	28
TOTAL FOOT Z	455.41	-82.39	3839.00	3794.00	
RES FOOT FORCE	541.16	47.23	3839.00	3940.00	

HEAD REST POS STUDY TEST: 427 SUBJ: M13 WT: 170.0 G: 10 GP: 1 CELL: D

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	3771.00	598.00	48
CARRIAGE X	1.49	-0.93	3839.00	3845.00	36
CARRIAGE Y	0.82	-0.61	3839.00	3812.00	31
CARRIAGE Z	12.07	-0.23	3832.00	3749.00	1
CARRIAGE Z (SM)	10.47	-0.08	3847.00	3644.00	
CARRIAGE VEL	-1.14	-25.44	4158.00	3797.00	29
SEAT X	1.43	-1.41	3800.00	3845.00	32
SEAT Y	0.80	-0.92	3814.00	3803.00	33
SEAT Z	11.52	-0.27	3839.00	3679.00	34
SEAT Z (SM)	10.71	-0.12	3839.00	3652.00	
CHEST X	3.71	-1.77	3847.00	3902.00	5
CHEST Y	0.25	-2.47	3909.00	3841.00	6
CHEST Z	23.51	-2.01	3855.00	3829.00	7
CHEST RES	23.66	0.68	3855.00	3790.00	
CHEST SI	42.59		3801.00	3934.00	
HEAD X	3.94	-0.18	3853.00	4016.00	2
HEAD Y	1.34	-0.71	3871.00	3846.00	3
HEAD Z	12.99	-1.35	3853.00	3700.00	4
HEAD RES	13.59	0.98	3853.00	4157.00	
HEAD SI	18.60		3811.00	3914.00	
HEAD HIC	14.54		3828.00	3881.00	
SHD REFL LF	58.60	14.30	3876.00	3955.00	14
SHD REEL LF	36.92	10.09	4071.00	3840.00	16
LF SHOULDER	91.24	35.87	3875.00	3948.00	
SHD REFL RT	37.32	10.36	3880.00	3960.00	15
SHD REEL RT	51.14	4.06	3885.00	3842.00	17
RT SHOULDER	85.79	21.53	3884.00	3967.00	
TOTAL SHLD REFL	95.92	25.36	3876.00	3956.00	
TOTAL SHLD REEL	79.34	14.37	3884.00	3841.00	
TOTAL SHOULDER	168.66	60.99	3884.00	3951.00	
TOTAL SHD / WT	0.99	0.36	3884.00	3951.00	
LF LAP BELT	34.84	3.94	3928.00	3842.00	8
RT LAP BELT	43.12	14.48	4062.00	3841.00	9
TOTAL LAP	76.05	18.48	4061.00	3842.00	
TOTAL LAP / WT	0.45	0.11	4061.00	3842.00	
CROTCH STRAP	108.56	-5.24	4065.00	3834.00	10
LF SEAT LNK X	23.40	-183.81	4104.00	3847.00	18
RT SEAT LNK X	0.75	-166.05	3839.00	3846.00	19
TOTAL SEAT X	1.66	-368.71	3931.00	3846.00	
SEAT LNK Y	40.71	-27.08	4042.00	3839.00	35
LF SEAT PAN Z	322.34	15.10	3846.00	3602.00	11
RT SEAT PAN Z	492.69	28.64	3855.00	3605.00	12
CT SEAT PAN Z	881.01	38.20	3856.00	3602.00	13
TOTAL SEAT Z	1671.85	91.07	3857.00	3602.00	
TOTAL SEAT Z / WT	9.83	0.54	3857.00	3602.00	
RES SEAT FORCE	1706.49	92.46	3855.00	3602.00	
RES SEAT FORCE / WT	10.04	0.54	3855.00	3602.00	
LF FOOT X	-14.79	-135.04	3798.00	3860.00	20
RT FOOT X	-16.60	-152.30	3839.00	3850.00	23
CT FOOT X	-18.34	-203.48	4117.00	3851.00	26
TOTAL FOOT X	-81.06	-466.46	3800.00	3850.00	
LF FOOT Y	147.13	-25.82	3834.00	3802.00	21
RT FOOT Y	24.28	-146.99	4095.00	3834.00	24
CT FOOT Y	34.58	-41.95	3813.00	3840.00	27
TOTAL FOOT Y	52.99	-62.01	3820.00	3841.00	
LF FOOT Z	205.84	-8.97	3835.00	3803.00	22
RT FOOT Z	256.49	11.07	3851.00	3830.00	25
CT FOOT Z	239.62	-94.02	3854.00	3855.00	28
TOTAL FOOT Z	559.74	-6.71	3853.00	3785.00	
RES FOOT FORCE	702.67	94.66	3851.00	3801.00	

HEAD REST POS STUDY TEST: 367 SUBJ: R-2 WT: 148.0 G: 10 GP: 1 CELL: D

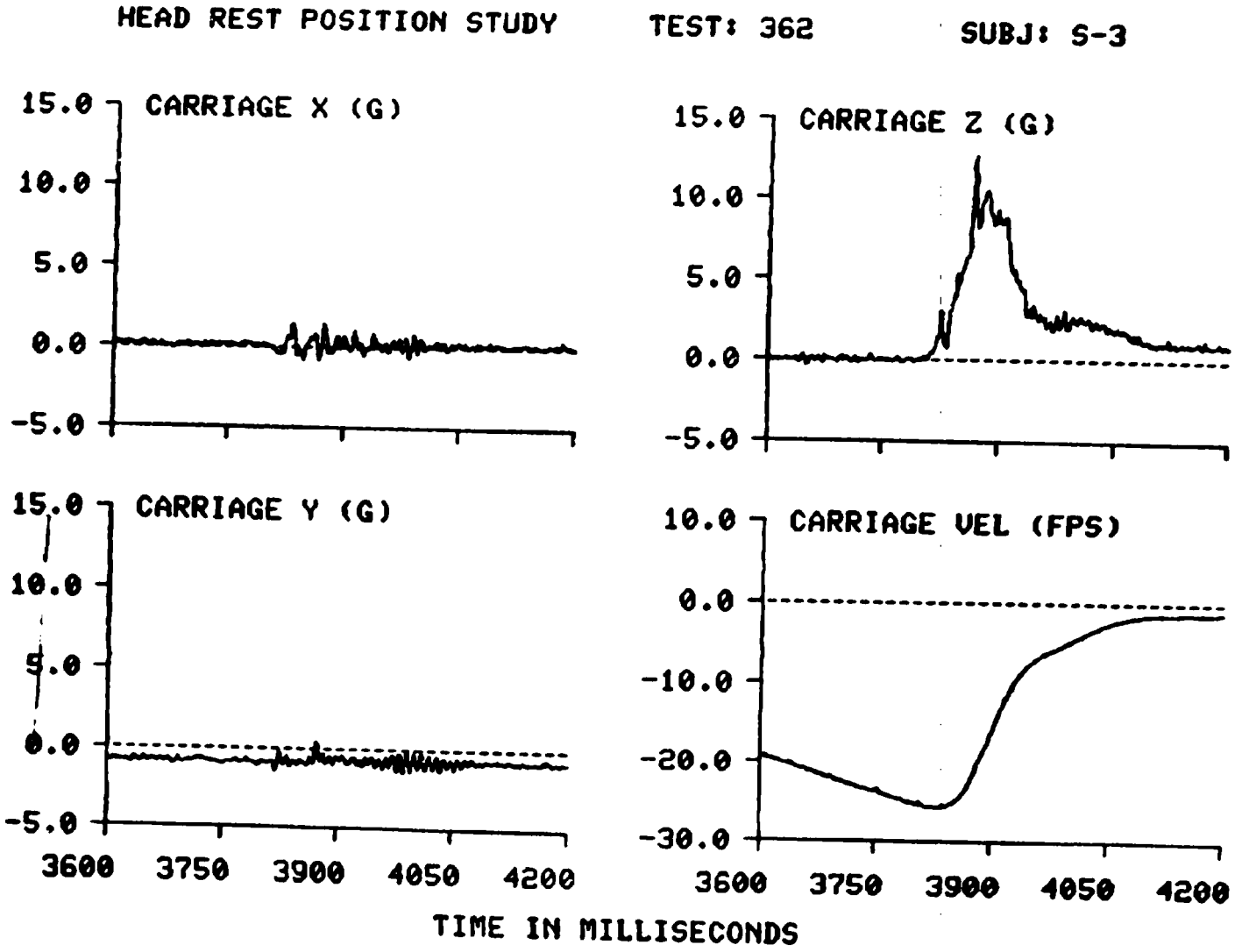
DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	1466.00	1093.00	48
CARRIAGE X	1.49	-1.21	3816.00	3830.00	36
CARRIAGE Y	0.71	-0.92	3853.00	3804.00	31
CARRIAGE Z	12.09	-0.42	3847.00	3769.00	1
CARRIAGE Z (SM)	10.44	-0.17	3863.00	3770.00	
CARRIAGE VEL	-0.92	-25.70	4124.00	3800.00	29
SEAT X	2.21	-1.40	3817.00	3828.00	32
SEAT Y	0.84	-0.87	3831.00	3889.00	33
SEAT Z	11.29	-0.27	3854.00	3691.00	34
SEAT Z (SM)	10.48	-0.19	3855.00	3675.00	
CHEST X	3.64	-0.51	3861.00	3622.00	5
CHEST Y	-0.49	-2.00	3912.00	3882.00	6
CHEST Z	10.89	-1.87	3882.00	3691.00	7
CHEST RES	11.20	0.63	3882.00	4077.00	
CHEST SI	17.31		3819.00	3911.00	
HEAD X	1.18	-2.52	3858.00	3892.00	2
HEAD Y	0.77	-0.63	3662.00	3884.00	3
HEAD Z	12.55	-0.70	3865.00	3679.00	4
HEAD RES	12.60	0.60	3865.00	3810.00	
HEAD SI	20.74		3819.00	3931.00	
HEAD HIC	17.78		3836.00	3908.00	
SHD REFL LF	65.08	24.27	3882.00	4099.00	14
SHD REEL LF	41.10	7.08	3891.00	3859.00	16
LF SHOULDER	103.80	35.06	3890.00	3859.00	
SHD REFL RT	64.01	26.41	3886.00	3952.00	15
SHD REEL RT	58.57	9.69	3891.00	3861.00	17
RT SHOULDER	119.66	47.50	3888.00	3852.00	
TOTAL SHLD REFL	128.23	51.18	3885.00	3952.00	
TOTAL SHLD REEL	99.67	17.12	3891.00	3860.00	
TOTAL SHOULDER	223.22	84.29	3889.00	3859.00	
TOTAL SHD / WT	1.51	0.57	3889.00	3859.00	
LF LAP BELT	42.84	11.98	3970.00	3856.00	8
RT LAP BELT	40.83	14.12	3962.00	3862.00	9
TOTAL LAP	82.72	28.11	3969.00	3856.00	
TOTAL LAP / WT	0.56	0.19	3969.00	3856.00	
CROTCH STRAP	183.21	53.09	3950.00	3859.00	10
LF SEAT LNK X	53.45	-140.53	4066.00	3863.00	18
RT SEAT LNK X	66.83	-45.75	9910.00	3860.00	19
TOTAL SEAT X	93.03	-185.70	3919.00	3862.00	
SEAT LNK Y	79.96	-27.73	3922.00	3855.00	35
LF SEAT PAN Z	336.44	17.36	3862.00	3608.00	11
RT SEAT PAN Z	334.82	15.99	3868.00	3637.00	12
CT SEAT PAN Z	926.15	81.85	3873.00	3828.00	13
TOTAL SEAT Z	1569.19	130.45	3865.00	3603.00	
TOTAL SEAT Z / WT	10.60	0.88	3865.00	3603.00	
RES SEAT FORCE	1578.73	137.65	3865.00	3603.00	
RES SEAT FORCE / WT	10.67	0.93	3865.00	3603.00	
LF FOOT X	14.85	-144.28	9818.00	3865.00	20
RT FOOT X	34.89	-110.50	3818.00	3866.00	23
CT FOOT X	46.37	-155.77	3818.00	3866.00	26
TOTAL FOOT X	96.11	-410.55	3818.00	3866.00	
LF FOOT Y	141.03	-17.94	3850.00	3806.00	21
RT FOOT Y	18.08	-139.77	3909.00	3866.00	24
CT FOOT Y	38.25	-73.88	3840.00	3868.00	27
TOTAL FOOT Y	74.28	-101.73	3839.00	3869.00	
LF FOOT Z	178.62	-27.55	3850.00	3808.00	22
RT FOOT Z	195.82	-12.06	3866.00	3827.00	25
CT FOOT Z	157.91	-125.24	3869.00	3829.00	28
TOTAL FOOT Z	408.05	-119.31	3872.00	3829.00	
RES FOOT FORCE	563.98	39.08	3866.00	4186.00	

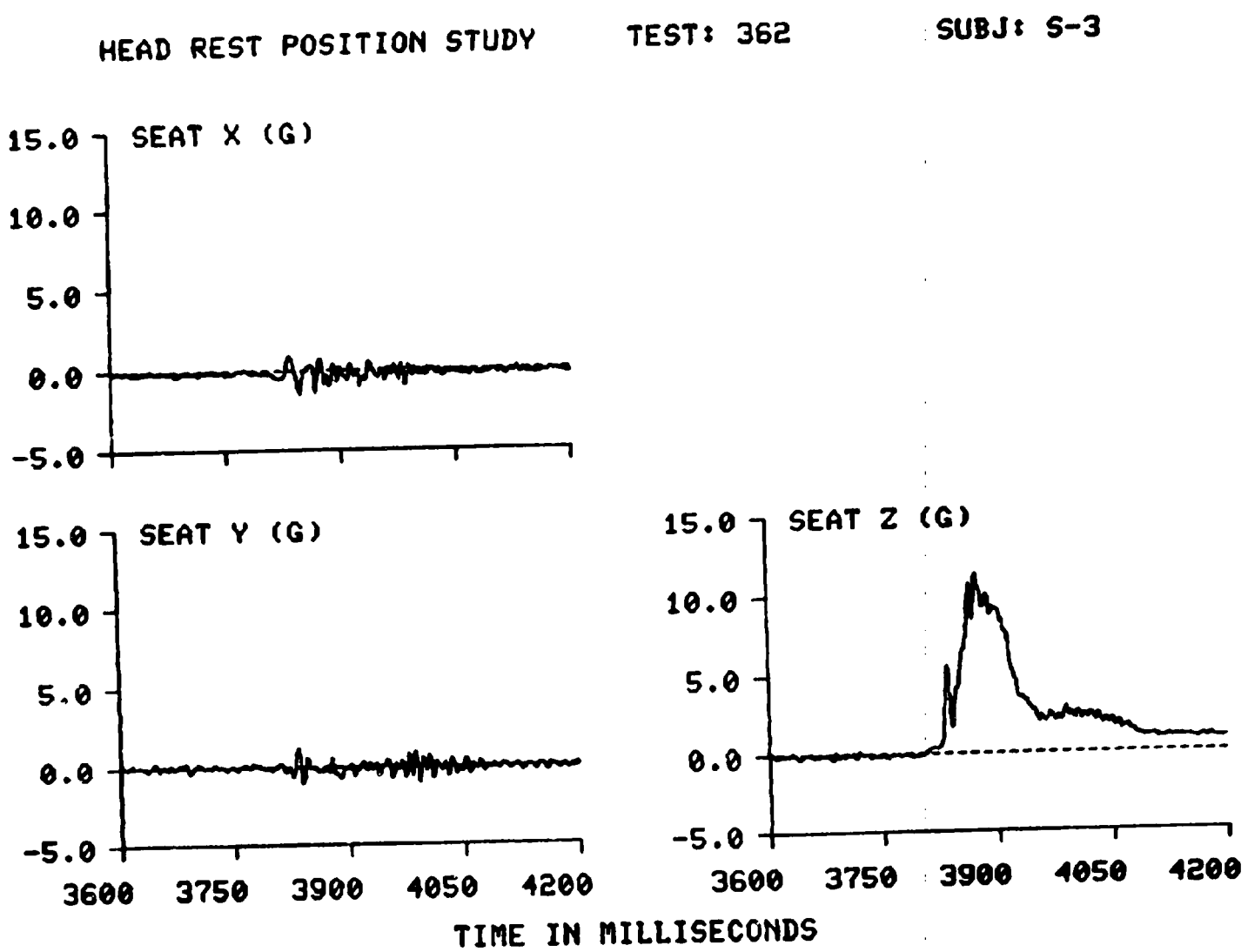
HEAD REST POS STUDY TEST: 372 SUBJ: M-3 WT: 146.0 G: 10 GP: 2 CELL: D

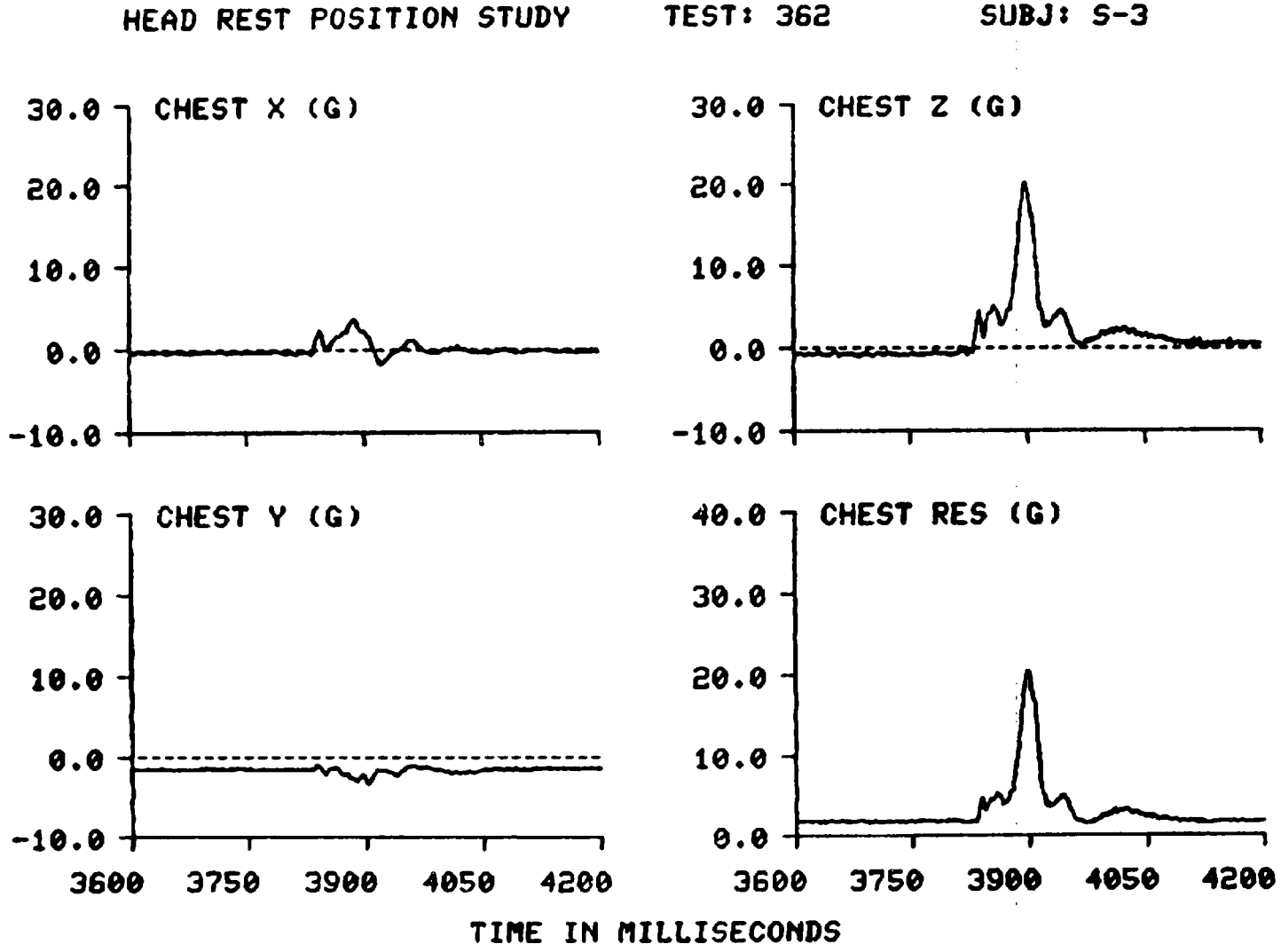
DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.08	9.97	152.00	697.00	48
CARRIAGE X	1.49	-1.05	3824.00	3838.00	36
CARRIAGE Y	0.75	-0.95	3884.00	3812.00	31
CARRIAGE Z	12.91	-0.21	3857.00	9645.00	1
CARRIAGE Z (SM)	10.81	-0.09	3857.00	3647.00	
CARRIAGE VEL	-1.04	-25.72	4132.00	3800.00	29
SEAT X	1.09	-1.23	3826.00	3836.00	32
SEAT Y	0.93	-1.56	3822.00	3829.00	33
SEAT Z	12.00	-0.24	3864.00	3672.00	34
SEAT Z (SM)	10.71	-0.18	3864.00	3672.00	
CHEST X	5.36	-2.28	3877.00	3918.00	5
CHEST Y	0.22	-2.77	3873.00	3899.00	6
CHEST Z	20.70	-1.08	3891.00	3857.00	7
CHEST RES	21.14	0.99	3891.00	3700.00	
CHEST SI	37.70		3823.00	3966.00	
HEAD X	2.87	-3.17	3883.00	3922.00	2
HEAD Y	1.75	0.68	3928.00	3896.00	3
HEAD Z	11.91	-1.07	3873.00	3683.00	4
HEAD RES	12.25	0.94	3873.00	3959.00	
HEAD SI	18.78		3829.00	3951.00	
HEAD HIC	15.13		3847.00	3929.00	
SHD REFL LF	52.42	15.10	3911.00	4100.00	14
SHD REEL LF	58.46	7.12	3914.00	3683.00	16
LF SHOULDER	110.45	37.04	3913.00	4100.00	
SHD REFL RT	98.90	19.82	3910.00	3987.00	15
SHD REEL RT	60.88	10.46	3916.00	3876.00	17
RT SHOULDER	97.48	33.20	3917.00	3977.00	
TOTAL SHLD REFL	91.14	35.89	3911.00	4099.00	
TOTAL SHLD REEL	118.15	18.69	3915.00	3884.00	
TOTAL SHOULDER	206.60	72.59	3914.00	3987.00	
TOTAL SHD / WT	1.42	0.50	3914.00	3987.00	
LF LAP BELT	48.07	10.81	3960.00	3881.00	8
RT LAP BELT	53.62	18.12	3969.00	3866.00	9
TOTAL LAP	100.21	30.78	3960.00	3882.00	
TOTAL LAP / WT	0.69	0.21	3960.00	3882.00	
CROTCH STRAP	107.87	-40.69	3972.00	3874.00	10
LF SEAT LNK X	45.33	-129.07	4096.00	3871.00	18
RT SEAT LNK X	10.42	-105.87	4072.00	3872.00	19
TOTAL SEAT X	42.76	-234.37	4096.00	3872.00	
SEAT LNK Y	50.28	-41.73	3946.00	3876.00	35
LF SEAT PAN Z	407.43	43.04	3874.00	3639.00	11
RT SEAT PAN Z	446.31	46.56	3873.00	3600.00	12
CT SEAT PAN Z	795.86	84.05	3880.00	3601.00	13
TOTAL SEAT Z	1558.07	165.69	3877.00	3600.00	
TOTAL SEAT Z / WT	10.67	1.13	3877.00	3600.00	
RES SEAT FORCE	1575.59	165.89	3876.00	3600.00	
RES SEAT FORCE / WT	10.79	1.14	3876.00	3600.00	
LF FOOT X	19.89	-103.85	3826.00	3874.00	20
RT FOOT X	29.30	-82.44	3824.00	3874.00	23
CT FOOT X	96.17	-108.73	3825.00	3875.00	26
TOTAL FOOT X	68.66	-294.12	3825.00	3874.00	
LF FOOT Y	119.47	-21.16	3859.00	3956.00	21
RT FOOT Y	24.76	-124.31	4013.00	3858.00	24
CT FOOT Y	17.46	-39.50	3994.00	3869.00	27
TOTAL FOOT Y	48.31	-59.96	3845.00	3879.00	
LF FOOT Z	153.93	-29.65	3861.00	3813.00	22
RT FOOT Z	138.04	-11.83	3867.00	4053.00	25
CT FOOT Z	165.65	-98.81	3822.00	3836.00	28
TOTAL FOOT Z	395.33	-95.93	3867.00	3835.00	
RES FOOT FORCE	425.05	11.36	3867.00	3628.00	

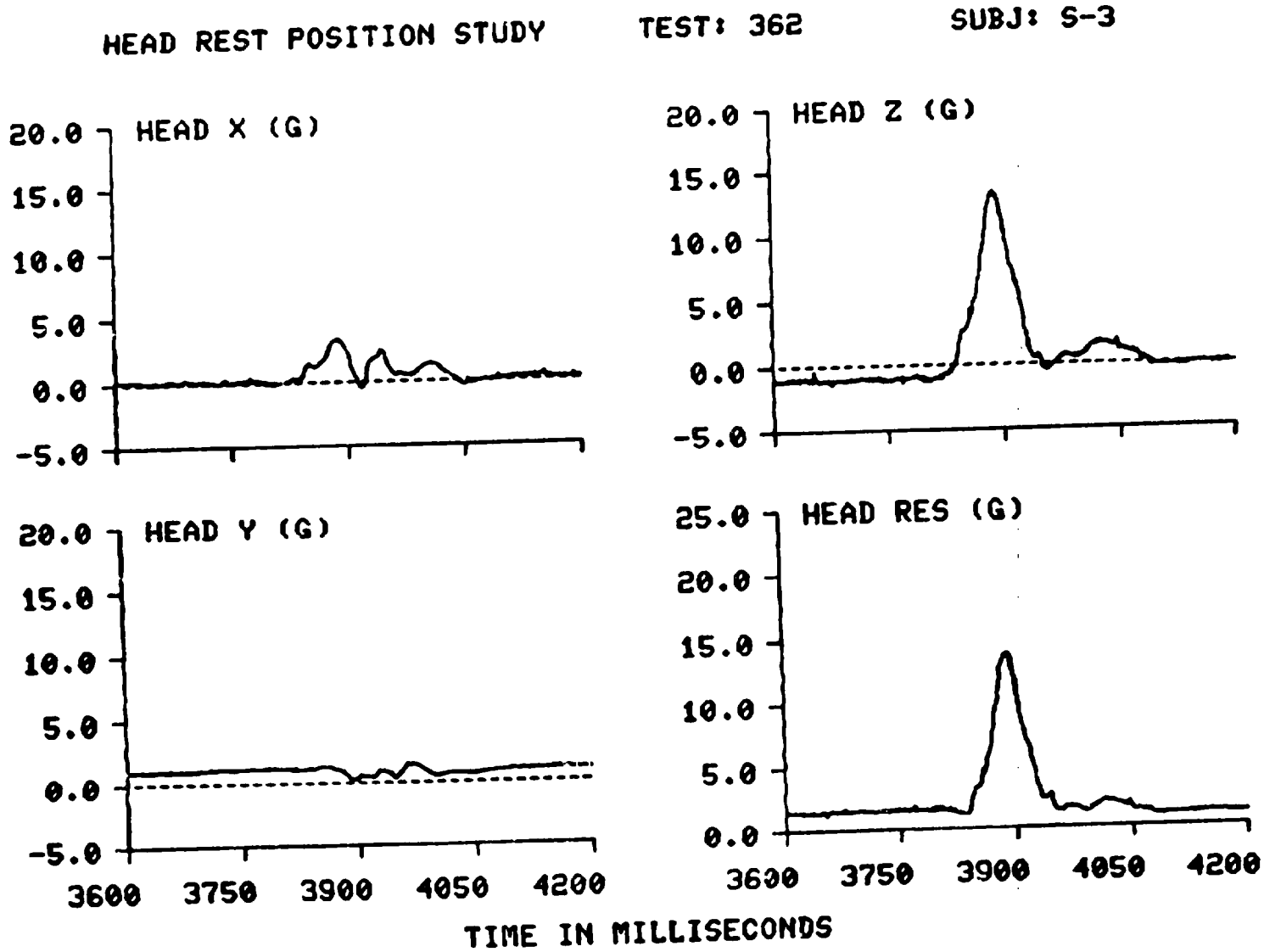
HEAD REST POS STUDY TEST: 362 SUBJ: S-3 WT: 166.0 G: 10 GP: 2 CELL: D

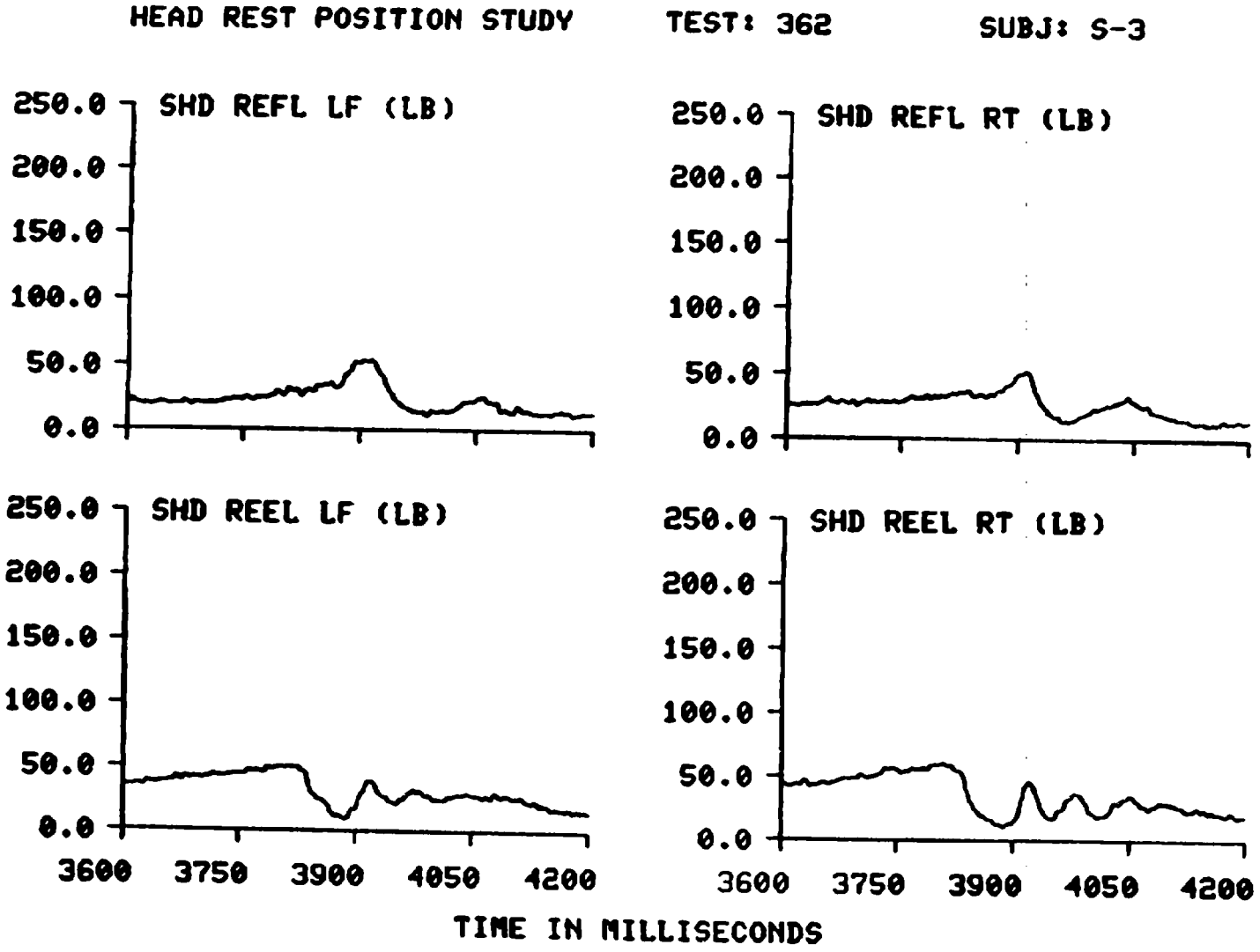
DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.95	523.00	777.00	48
CARRIAGE X	1.39	-0.83	3873.00	3847.00	36
CARRIAGE Y	0.44	-1.51	3873.00	3987.00	31
CARRIAGE Z	12.72	-0.35	3867.00	3651.00	1
CARRIAGE Z (SM)	10.60	-0.15	3867.00	3652.00	
CARRIAGE VEL	-1.11	-25.79	4195.00	3819.00	29
SEAT X	0.90	-1.43	3833.00	3846.00	32
SEAT Y	1.11	-1.11	3834.00	3839.00	33
SEAT Z	11.28	-0.37	3874.00	3684.00	34
SEAT Z (SM)	10.57	-0.25	3875.00	3683.00	
CHEST X	3.68	-1.71	3888.00	3923.00	5
CHEST Y	-1.03	-3.28	3837.00	3902.00	6
CHEST Z	20.20	-1.09	3897.00	3658.00	7
CHEST RES	20.48	1.43	3898.00	3978.00	
CHEST SI	36.05		3835.00	3958.00	
HEAD X	3.29	-0.47	3888.00	3918.00	2
HEAD Y	1.40	0.22	3971.00	3896.00	3
HEAD Z	13.34	-1.40	3889.00	3678.00	4
HEAD RES	13.74	0.82	3889.00	4082.00	
HEAD SI	20.94		3841.00	3949.00	
HEAD HIC	17.29		3865.00	3921.00	
SHD REEL LF	54.44	11.64	3914.00	3986.00	14
SHD REEL LF	39.49	9.63	3917.00	3886.00	16
LF SHOULDER	92.91	38.00	3916.00	4012.00	
SHD REEL RT	51.89	13.66	3910.00	3958.00	15
SHD REEL RT	45.67	10.59	3921.00	3887.00	17
RT SHOULDER	89.60	33.06	3916.00	3954.00	
TOTAL SHLD REEL	105.59	28.82	3912.00	3987.00	
TOTAL SHLD REEL	84.55	20.30	3920.00	3887.00	
TOTAL SHOULDER	182.50	73.06	3916.00	3954.00	
TOTAL SHD / WT	1.10	0.44	3916.00	3954.00	
LF LAP BELT	54.92	20.02	3970.00	3879.00	8
RT LAP BELT	48.07	21.06	3967.00	3888.00	9
TOTAL LAP	100.13	42.02	3969.00	3878.00	
TOTAL LAP / WT	0.60	0.25	3969.00	3878.00	
CROTCH STRAP	98.17	-65.92	3978.00	3889.00	10
LF SEAT LNK X	32.58	-182.12	4115.00	3886.00	18
RT SEAT LNK X	7.47	-136.03	3857.00	3881.00	19
TOTAL SEAT X	26.24	-312.67	3657.00	3885.00	
SEAT LNK Y	48.54	-80.99	3951.00	3891.00	35
LF SEAT PAN Z	586.68	53.54	3891.00	3620.00	11
RT SEAT PAN Z	468.68	44.68	3887.00	3601.00	12
CT SEAT PAN Z	739.52	42.91	3893.00	3614.00	13
TOTAL SEAT Z	1784.78	149.64	3890.00	3602.00	
TOTAL SEAT Z / WT	10.75	0.90	3890.00	3602.00	
RES SEAT FORCE	1811.34	150.83	3890.00	3602.00	
RES SEAT FORCE / WT	10.91	0.91	3890.00	3602.00	
LF FOOT X	9.64	-114.93	3834.00	3898.00	20
RT FOOT X	22.06	-73.10	3835.00	3868.00	23
CT FOOT X	41.75	-131.77	3835.00	3896.00	26
TOTAL FOOT X	68.34	-281.03	3834.00	3896.00	
LF FOOT Y	119.74	-16.53	3869.00	3961.00	21
RT FOOT Y	23.55	-124.65	3993.00	3886.00	24
CT FOOT Y	36.95	-41.37	4008.00	3881.00	27
TOTAL FOOT Y	45.76	-66.49	3854.00	3888.00	
LF FOOT Z	161.18	-43.66	3894.00	4007.00	22
RT FOOT Z	152.18	-33.29	3869.00	3865.00	25
CT FOOT Z	293.24	-80.22	3876.00	3825.00	28
TOTAL FOOT Z	487.39	-90.46	3894.00	3825.00	
RES FOOT FORCE	554.77	4.83	3894.00	4155.00	

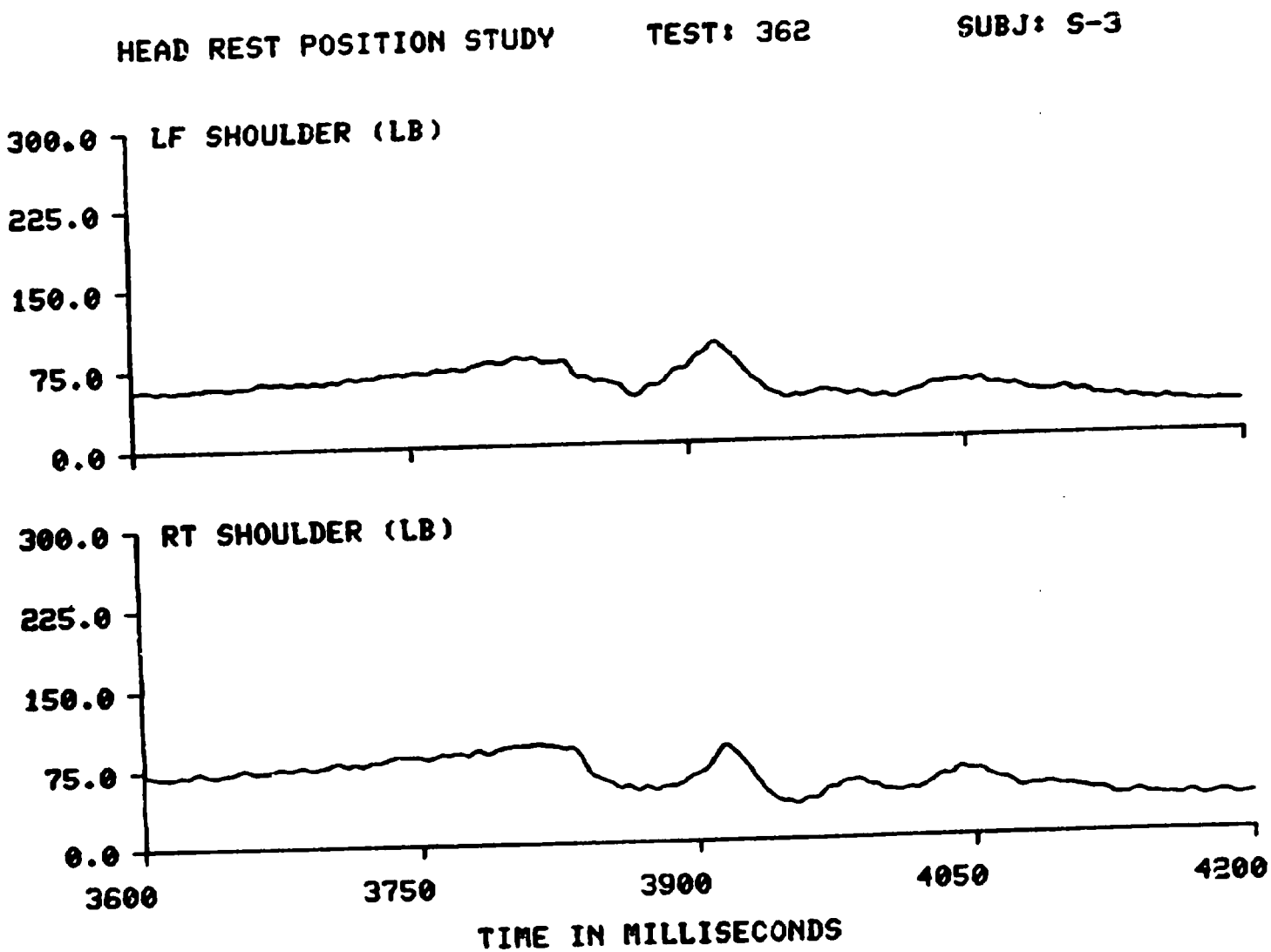

HEAD REST POSITION STUDY
TEST: 362
SUBJ: S-3
CARRIAGE X (G)
CARRIAGE Z (G)
CARRIAGE Y (G)
CARRIAGE VEL (FPS)
15.0
10.0
5.0
0.0
-5.0
-10.0
-20.0
-30.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

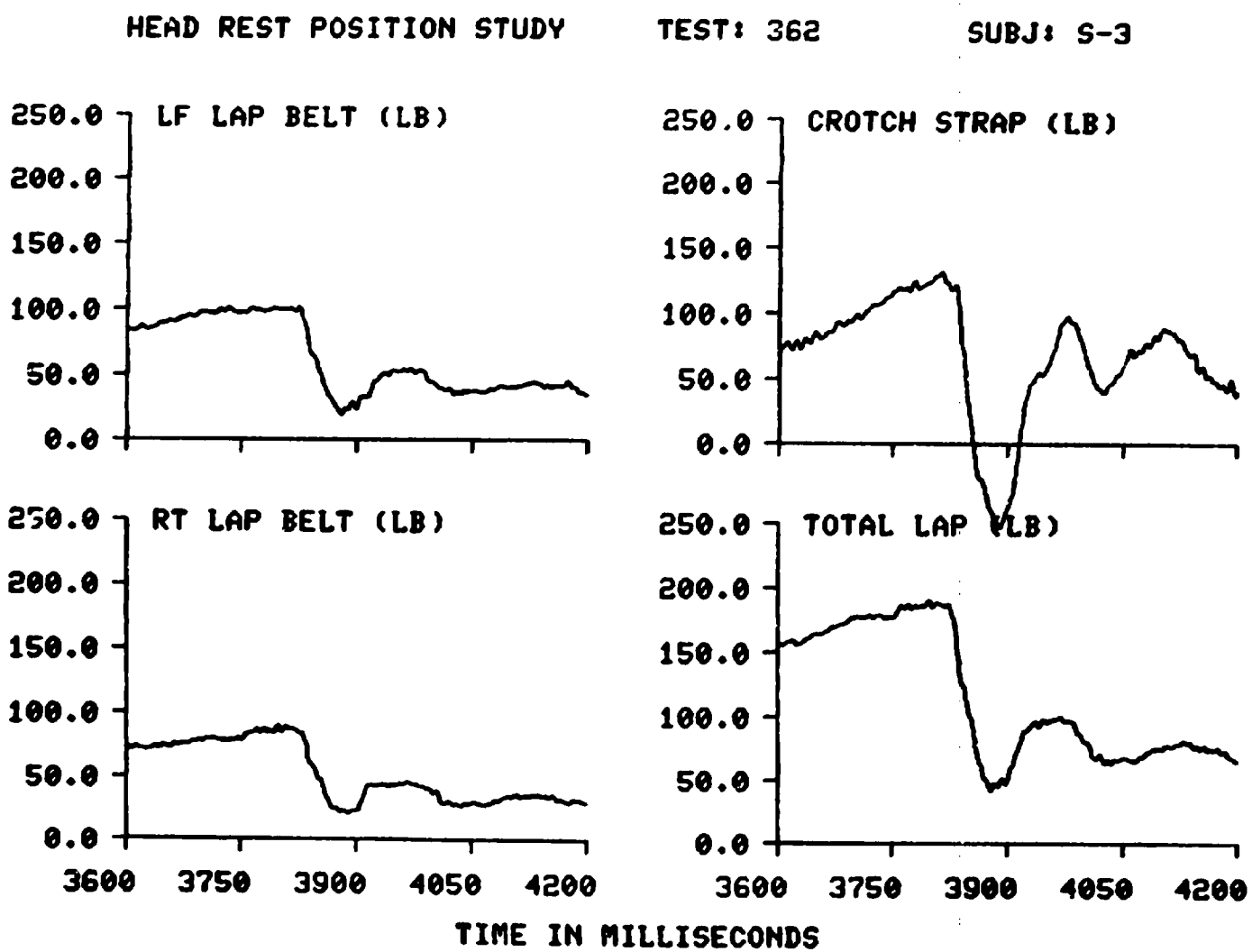

HEAD REST POSITION STUDY
TEST: 362
SUBJ: S-3
SEAT X (G)
15.0
10.0
5.0
0.0
-5.0
SEAT Y (G)
SEAT Z (G)
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

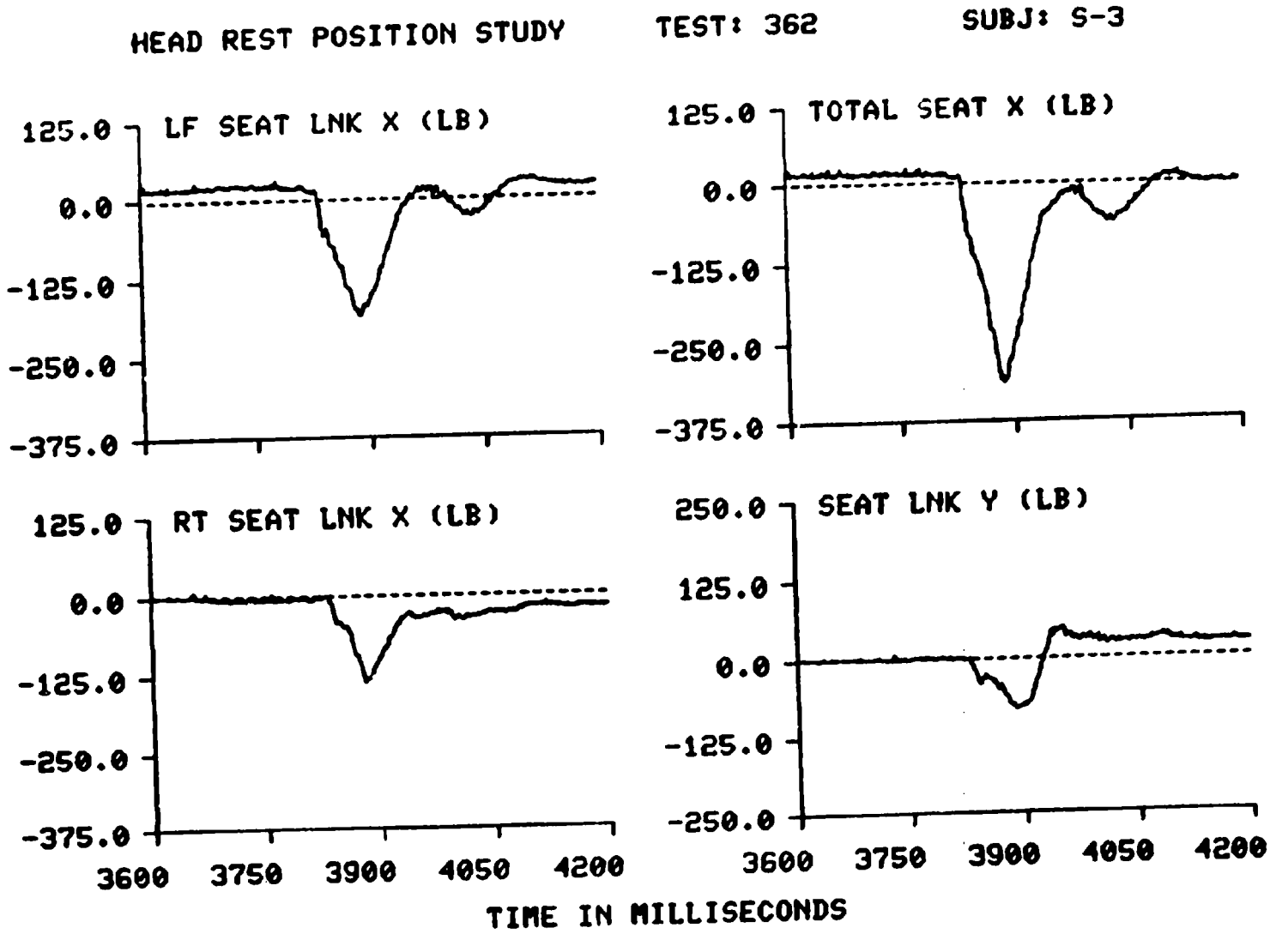

HEAD REST POSITION STUDY
TEST: 362
SUBJ: S-3
CHEST X (G)
CHEST Z (G)
CHEST Y (G)
CHEST RES (G)
30.0
20.0
10.0
0.0
-10.0
40.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

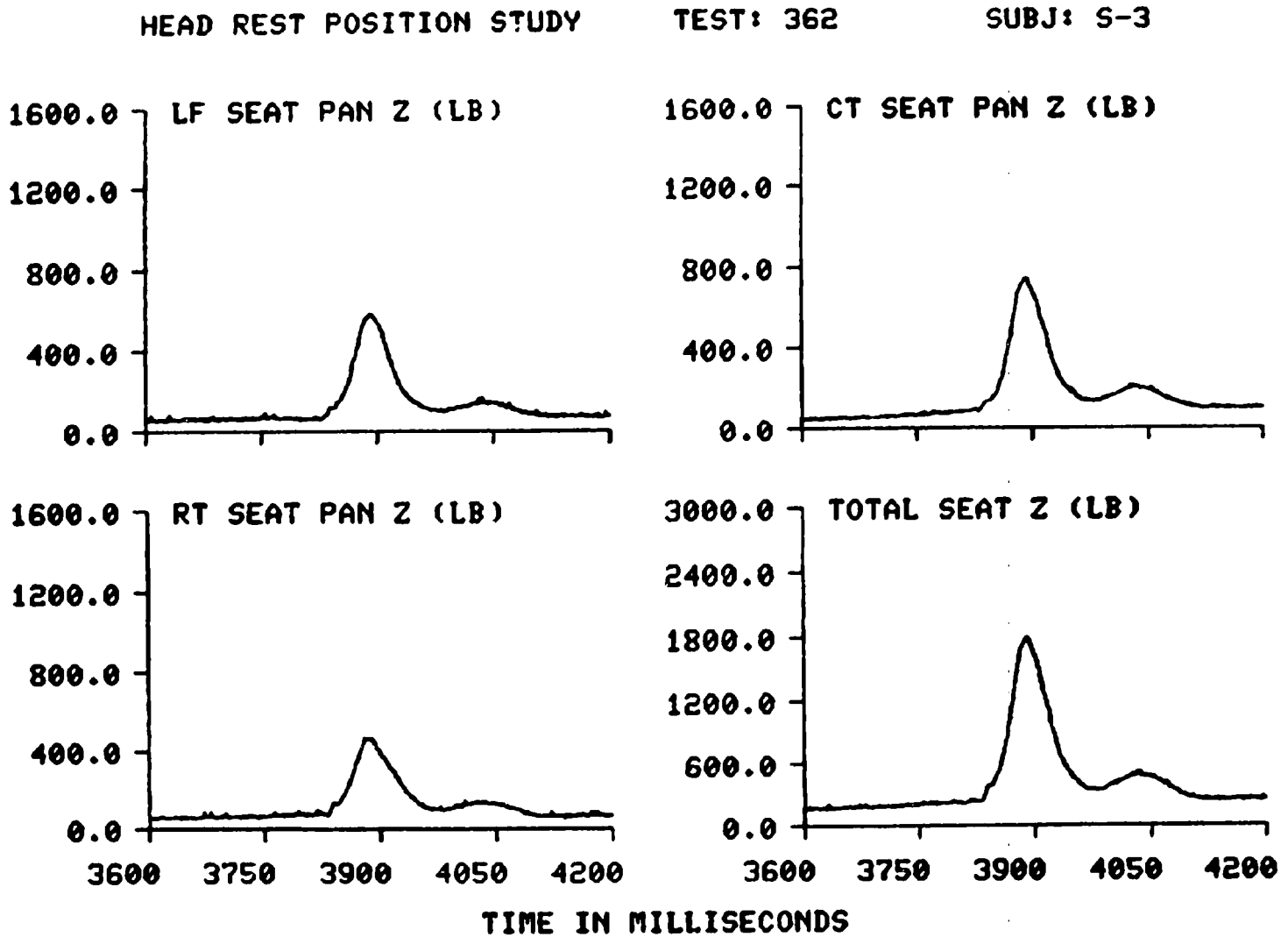

HEAD REST POSITION STUDY
TEST: 362
SUBJ: S-3
HEAD X (G)
20.0
15.0
10.0
5.0
0.0
-5.0
HEAD Z (G)
20.0
15.0
10.0
5.0
0.0
-5.0
HEAD Y (G)
20.0
15.0
10.0
5.0
0.0
-5.0
HEAD RES (G)
25.0
20.0
15.0
10.0
5.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

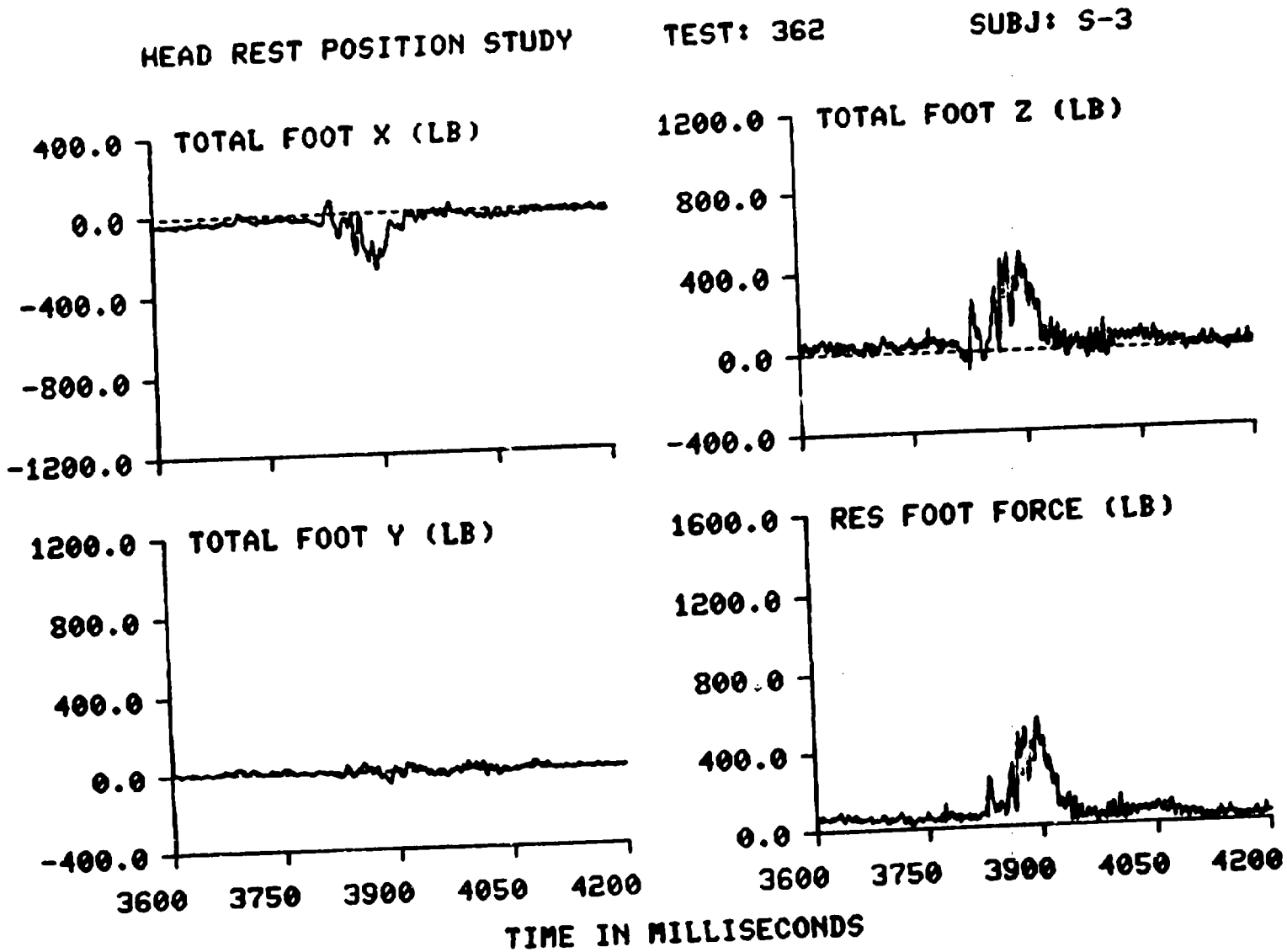

HEAD REST POSITION STUDY
TEST: 362
SUBJ: S-3
SHD REFL LF (LB)
SHD REFL RT (LB)
SHD REEL LF (LB)
SHD REEL RT (LB)
250.0
200.0
150.0
100.0
50.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 362
SUBJ: S-3
LF SHOULDER (LB)
300.0
225.0
150.0
75.0
0.0
RT SHOULDER (LB)
300.0
225.0
150.0
75.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 362
SUBJ: S-3
LF LAP BELT (LB)
CROTCH STRAP (LB)
RT LAP BELT (LB)
TOTAL LAP (LB)
250.0
200.0
150.0
100.0
50.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 362
SUBJ: S-3
LF SEAT LNK X (LB)
TOTAL SEAT X (LB)
RT SEAT LNK X (LB)
SEAT LNK Y (LB)
125.0
0.0
-125.0
-250.0
-375.0
250.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 362
SUBJ: S-3
LF SEAT PAN Z (LB)
CT SEAT PAN Z (LB)
RT SEAT PAN Z (LB)
TOTAL SEAT Z (LB)
1600.0
1200.0
800.0
400.0
0.0
3000.0
2400.0
1800.0
600.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 362
SUBJ: S-3
TOTAL FOOT X (LB)
400.0
0.0
-400.0
-800.0
-1200.0
TOTAL FOOT Z (LB)
1200.0
800.0
400.0
0.0
-400.0
TOTAL FOOT Y (LB)
1200.0
800.0
400.0
0.0
-400.0
RES FOOT FORCE (LB)
1600.0
1200.0
800.0
400.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

HEAD REST POS STUDY TEST: 410 SUBJ: 0-1 WT: 208.0 G: 10 GP: 1 CELL: E

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	147.00	517.00	48
CARRIAGE X	1.50	-0.92	3891.00	3885.00	36
CARRIAGE Y	0.41	-0.74	3891.00	3837.00	31
CARRIAGE Z	12.67	-0.28	3885.00	3697.00	1
CARRIAGE Z (SM)	10.33	-0.11	3885.00	3668.00	
CARRIAGE VEL	-1.16	-25.81	4194.00	3850.00	29
SEAT X	1.12	-1.93	3890.00	3885.00	32
SEAT Y	0.79	-1.19	3965.00	3855.00	33
SEAT Z	11.68	-0.30	3892.00	3677.00	34
SEAT Z (SM)	10.40	-0.18	3892.00	3629.00	
CHEST X	5.70	-3.16	3907.00	3935.00	5
CHEST Y	0.73	-3.03	3896.00	3920.00	6
CHEST Z	17.96	-1.08	3921.00	3703.00	7
CHEST RES	18.22	0.49	3921.00	3994.00	
CHEST SI	42.67		3869.00	3980.00	
HEAD X	1.93	-4.56	3906.00	3945.00	2
HEAD Y	3.25	0.01	4024.00	3943.00	3
HEAD Z	15.36	-1.22	3906.00	3716.00	4
HEAD RES	15.50	0.78	3906.00	4057.00	
HEAD SI	25.91		3865.00	3982.00	
HEAD HIC	21.30		3886.00	3948.00	
LF SHOULDER	76.03	11.34	3925.00	4040.00	16
RT SHOULDER	90.67	8.68	3922.00	4027.00	17
TOTAL SHOULDER	156.57	22.55	3925.00	4030.00	
TOTAL SHO / WT	0.80	0.11	3925.00	4030.00	
LF LAP BELT	63.70	15.66	3994.00	3891.00	8
RT LAP BELT	59.60	12.99	3998.00	3894.00	9
TOTAL LAP	122.87	29.96	3997.00	3893.00	
TOTAL LAP / WT	0.59	0.14	3997.00	3893.00	
LF SEAT LNK X	35.42	-238.56	4152.00	3902.00	18
RT SEAT LNK X	17.94	-93.40	3959.00	3900.00	19
TOTAL SEAT X	34.38	-328.91	3987.00	3903.00	
SEAT LNK Y	46.97	-83.59	3971.00	3898.00	35
LF SEAT PAN Z	541.25	8.70	3902.00	3748.00	11
RT SEAT PAN Z	536.57	15.15	3903.00	3607.00	12
CT SEAT PAN Z	1233.95	30.98	3904.00	3614.00	13
TOTAL SEAT Z	2298.59	68.55	3904.00	3607.00	
TOTAL SEAT Z / WT	11.05	0.33	3904.00	3607.00	
RES SEAT FORCE	2322.76	69.58	3904.00	3607.00	
RES SEAT FORCE / WT	11.17	0.33	3904.00	3607.00	
LF FOOT X	-2.51	-204.13	3852.00	3903.00	20
RT FOOT X	-14.13	-230.90	4152.00	3903.00	23
CT FOOT X	-12.36	-280.69	4134.00	3904.00	26
TOTAL FOOT X	-49.68	-713.93	4152.00	3903.00	
LF FOOT Y	185.16	-23.80	3887.00	3970.00	21
RT FOOT Y	25.86	-184.46	3719.00	3895.00	24
CT FOOT Y	22.50	-53.15	3937.00	3899.00	27
TOTAL FOOT Y	58.49	-67.20	3929.00	3909.00	
LF FOOT Z	269.25	3.63	3888.00	3994.00	22
RT FOOT Z	303.51	20.25	3903.00	4162.00	25
CT FOOT Z	139.68	-108.62	3894.00	3843.00	28
TOTAL FOOT Z	634.60	-26.96	3906.00	3843.00	
RES FOOT FORCE	921.60	62.42	3903.00	4152.00	

HEAD REST POS STUDY TEST: 412 SUBJ: F-3 WT: 164.0 G: 10 GP: 1 CELL: E

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	1906.00	628.00	48
CARRIAGE X	1.47	-1.15	3830.00	3838.00	36
CARRIAGE Y	1.07	-0.32	3868.00	3811.00	31
CARRIAGE Z	12.13	-0.24	3860.00	3633.00	1
CARRIAGE Z (SM)	10.38	-0.10	3860.00	3758.00	
CARRIAGE VEL	-1.10	-25.78	4168.00	3819.00	29
SEAT X	1.86	-1.12	3831.00	3837.00	32
SEAT Y	0.84	-0.86	3924.00	3800.00	33
SEAT Z	11.63	-0.29	3867.00	3638.00	34
SEAT Z (SM)	10.47	-0.14	3867.00	3639.00	
CHEST X	2.87	-1.73	3880.00	3920.00	5
CHEST Y	-0.32	-2.37	4033.00	3881.00	6
CHEST Z	16.52	-0.67	3898.00	3684.00	7
CHEST RES	16.70	0.84	3898.00	3994.00	
CHEST SI	37.64		3827.00	3971.00	
HEAD X	1.12	-3.43	3986.00	3920.00	2
HEAD Y	1.48	-1.65	3988.00	3882.00	3
HEAD Z	13.87	-0.87	3881.00	3632.00	4
HEAD RES	13.97	0.60	3882.00	3610.00	
HEAD SI	24.80		3839.00	3958.00	
HEAD HIC	21.47		3861.00	3920.00	
LF SHOULDER	89.04	12.19	3896.00	3985.00	16
RT SHOULDER	73.77	20.38	3902.00	3997.00	17
TOTAL SHOULDER	159.65	32.87	3900.00	3985.00	
TOTAL SHD / WT	0.97	0.20	3900.00	3985.00	
LF LAP BELT	53.36	15.66	3955.00	3862.00	8
RT LAP BELT	50.64	10.37	3959.00	3868.00	9
TOTAL LAP	103.17	26.70	3958.00	3862.00	
TOTAL LAP / WT	0.63	0.16	3958.00	3862.00	
LF SEAT LNK X	16.36	-223.66	3972.00	3876.00	18
RT SEAT LNK X	12.20	-95.43	3832.00	3877.00	19
TOTAL SEAT X	1.34	-319.09	3972.00	3877.00	
SEAT LNK Y	52.10	-56.85	3941.00	3881.00	35
LF SEAT PAN Z	447.59	9.04	3891.00	3666.00	11
RT SEAT PAN Z	369.46	1.78	3883.00	3722.00	12
CT SEAT PAN Z	912.79	11.96	3880.00	3694.00	13
TOTAL SEAT Z	1721.58	36.47	3881.00	3669.00	
TOTAL SEAT Z / WT	10.50	0.22	3881.00	3669.00	
RES SEAT FORCE	751.60	41.89	3881.00	3669.00	
RES SEAT FORCE / WT	10.68	0.26	3881.00	3669.00	
LF FOOT X	-32.33	-192.36	3674.00	3877.00	20
RT FOOT X	19.20	-119.86	3829.00	3878.00	23
CT FOOT X	-18.71	-223.53	3830.00	3878.00	26
TOTAL FOOT X	-45.77	-527.61	3830.00	3878.00	
LF FOOT Y	162.88	-20.54	3862.00	3816.00	21
RT FOOT Y	24.79	-143.82	3740.00	3879.00	24
CT FOOT Y	18.37	-47.49	3852.00	3880.00	27
TOTAL FOOT Y	54.75	-62.36	3850.00	3890.00	
LF FOOT Z	255.25	17.95	3863.00	3820.00	22
RT FOOT Z	228.40	23.06	3878.00	4061.00	25
CT FOOT Z	144.77	-113.74	3829.00	3842.00	28
TOTAL FOOT Z	535.24	-28.74	3864.00	3840.00	
RES FOOT FORCE	709.55	105.21	3863.00	4196.00	

HEAD REST POS STUDY TEST: 432 SUBJ: F-2 WT: 161.0 G: 10 GP: 1 CELL: E

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.98	1945.00	677.00	48
CARRIAGE X	1.55	-0.85	3847.00	3814.00	36
CARRIAGE Y	0.79	-0.81	3809.00	3823.00	31
CARRIAGE Z	11.77	-0.26	3839.00	3766.00	1
CARRIAGE Z (SM)	10.38	-0.09	3840.00	3657.00	
CARRIAGE VEL	-0.90	-25.67	4136.00	3809.00	29
SEAT X	1.18	-1.27	3848.00	3853.00	32
SEAT Y	0.79	-0.94	3876.00	3839.00	33
SEAT Z	11.64	-0.20	3847.00	3683.00	34
SEAT Z (SM)	10.41	-0.14	3847.00	3682.00	
CHEST X	3.21	-2.45	3861.00	3891.00	5
CHEST Y	-0.32	-2.03	3887.00	3918.00	6
CHEST Z	25.66	-0.74	3867.00	3946.00	7
CHEST RES	23.79	0.74	3867.00	3952.00	
CHEST SI	54.90		3825.00	3931.00	
HEAD X	2.88	-4.14	3865.00	3891.00	2
HEAD Y	1.79	-2.07	3907.00	3861.00	3
HEAD Z	18.88	-1.95	3864.00	3679.00	4
HEAD RES	17.24	0.97	3864.00	3968.00	
HEAD SI	28.17		3831.00	3920.00	
HEAD HIC	23.84		3846.00	3889.00	
LF SHOULDER	79.22	12.44	3877.00	3962.00	16
RT SHOULDER	90.11	4.60	3876.00	3964.00	17
TOTAL SHOULDER	162.83	17.60	3877.00	3963.00	
TOTAL SHD / WT	1.01	0.11	3877.00	3963.00	
LF LAP BELT	42.25	9.10	3955.00	3845.00	8
RT LAP BELT	47.91	10.80	3949.00	3848.00	9
TOTAL LAP	85.88	20.24	3951.00	3847.00	
TOTAL LAP / WT	0.53	0.13	3951.00	3847.00	
LF SEAT LNK X	4.75	-283.62	4127.00	3863.00	18
RT SEAT LNK X	2.33	-174.58	3727.00	3863.00	19
TOTAL SEAT X	-5.61	-458.20	3608.00	3863.00	
SEAT LNK Y	34.64	-116.08	4057.00	3858.00	35
LF SEAT PAN Z	600.37	2.34	3862.00	3632.00	11
RT SEAT PAN Z	543.25	2.82	3864.00	3707.00	12
CT SEAT PAN Z	869.04	2.94	3863.00	3746.00	13
TOTAL SEAT Z	2004.66	17.86	3862.00	3632.00	
TOTAL SEAT Z / WT	12.45	0.11	3862.00	3632.00	
RES SEAT FORCE	2059.05	21.53	3862.00	3632.00	
RES SEAT FORCE / WT	12.79	0.13	3862.00	3632.00	
LF FOOT X	4.01	-105.38	3808.00	3857.00	20
RT FOOT X	-11.16	-146.86	3806.00	3857.00	23
CT FOOT X	-14.11	-178.69	3808.00	3857.00	26
TOTAL FOOT X	-31.93	-430.93	3807.00	3857.00	
LF FOOT Y	125.13	-30.34	3842.00	3923.00	21
RT FOOT Y	21.16	-174.08	3736.00	3851.00	24
CT FOOT Y	70.41	-13.24	3880.00	3925.00	27
TOTAL FOOT Y	61.14	-62.46	3821.00	3925.00	
LF FOOT Z	216.12	17.67	3843.00	3812.00	22
RT FOOT Z	219.88	16.88	3850.00	3896.00	25
CT FOOT Z	168.50	-68.06	3847.00	3799.00	28
TOTAL FOOT Z	567.32	4.06	3850.00	3799.00	
RES FOOT FORCE	857.93	80.44	3851.00	4194.00	

HEAD REST POS STUDY TEST: 409 SUBJ: 0-3 WT: 159.0 G: 10 GP: 2 CELL: E

DATA ID	MAX	MIN	T1	T2	CH
IDV EXT PWR	10.05	9.07	684.00	80.00	48
CARRIAGE X	1.73	-1.19	3887.00	3880.00	36
CARRIAGE Y	1.09	-0.70	3886.00	3831.00	31
CARRIAGE Z	13.07	-0.24	3860.00	3664.00	1
CARRIAGE Z (SM)	10.87	-0.13	3881.00	3600.00	
CARRIAGE VEL	-1.15	-25.70	4190.00	3851.00	29
SEAT X	1.49	-1.57	3849.00	3894.00	32
SEAT Y	0.72	-1.02	3940.00	3904.00	33
SEAT Z	11.93	-0.25	3887.00	3695.00	34
SEAT Z (SM)	10.73	-0.16	3888.00	3696.00	
CHEST X	5.51	-2.11	3902.00	3957.00	5
CHEST Y	0.01	-4.06	3996.00	3929.00	6
CHEST Z	23.52	-0.80	3923.00	3823.00	7
CHEST RES	29.63	0.64	3923.00	3838.00	
CHEST SI	46.87		3843.00	3995.00	
HEAD X	1.28	-5.58	3890.00	3960.00	2
HEAD Y	1.75	-0.32	3973.00	3929.00	3
HEAD Z	16.13	-1.35	3900.00	3811.00	4
HEAD RES	16.17	1.11	3900.00	4118.00	
HEAD SI	24.25		3869.00	3985.00	
HEAD HIC	17.00		3884.00	3918.00	
LF SHOULDER	70.24	7.57	3928.00	4039.00	16
RT SHOULDER	60.63	5.60	3930.00	3863.00	17
TOTAL SHOULDER	130.38	13.89	3929.00	4031.00	
TOTAL SHO / WT	0.82	0.09	3929.00	4031.00	
LF LAP BELT	44.33	2.67	3977.00	3883.00	8
RT LAP BELT	64.16	7.20	3982.00	3891.00	9
TOTAL LAP	108.51	12.36	3984.00	3883.00	
TOTAL LAP / WT	0.67	0.08	3984.00	3883.00	
LF SEAT LNK X	-4.82	-225.37	4174.00	3904.00	18
RT SEAT LNK X	8.14	-79.08	3850.00	3903.00	19
TOTAL SEAT X	-19.64	-301.97	3697.00	3904.00	
SEAT LNK Y	44.74	-116.87	3981.00	3904.00	35
LF SEAT PAN Z	777.89	18.90	3904.00	3620.00	11
RT SEAT PAN Z	678.56	14.70	3905.00	3638.00	12
CT SEAT PAN Z	535.27	3.56	3905.00	3676.00	13
TOTAL SEAT Z	1883.98	51.00	3904.00	3627.00	
TOTAL SEAT Z / WT	12.48	0.32	3904.00	3627.00	
RES SEAT FORCE	2010.23	56.28	3904.00	3627.00	
RES SEAT FORCE / WT	12.64	0.35	3904.00	3627.00	
LF FOOT X	3.91	-107.30	3605.00	3896.00	20
RT FOOT X	15.93	-96.86	3887.00	3907.00	23
CT FOOT X	52.95	-193.98	3848.00	3907.00	26
TOTAL FOOT X	62.21	-336.34	3848.00	3907.00	
LF FOOT Y	108.75	-17.03	3883.00	4035.00	21
RT FOOT Y	20.66	-100.03	3937.00	3882.00	24
CT FOOT Y	22.41	-52.35	3850.00	3902.00	27
TOTAL FOOT Y	50.80	-49.56	3866.00	3891.00	
LF FOOT Z	162.43	-24.34	3907.00	3849.00	22
RT FOOT Z	191.21	-27.85	3908.00	3850.00	25
CT FOOT Z	159.67	-98.89	3869.00	3858.00	28
TOTAL FOOT Z	409.17	-107.44	3907.00	3858.00	
RES FOOT FORCE	529.79	9.42	3907.00	3602.00	

HEAD REST POS STUDY TEST: 437 SUBJ: G-2 WT: 120.0 G: 10 GP: 2 CELL: E

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.98	200.00	871.00	48
CARRIAGE X	1.94	-0.90	3848.00	3886.00	36
CARRIAGE Y	0.84	-0.73	3893.00	3839.00	31
CARRIAGE Z	12.35	-0.22	3887.00	3699.00	1
CARRIAGE Z (SM)	10.73	-0.11	3887.00	3699.00	
CARRIAGE VEL	-0.85	-25.75	4191.00	3846.00	29
SEAT X	1.26	-1.07	3848.00	3901.00	32
SEAT Y	0.71	-1.06	3967.00	3902.00	33
SEAT Z	11.68	-0.22	3894.00	3724.00	34
SEAT Z (SM)	10.86	-0.12	3894.00	3707.00	
CHEST X	4.61	-1.51	3911.00	3947.00	5
CHEST Y	-0.53	-1.64	3904.00	4008.00	6
CHEST Z	17.47	-0.88	3925.00	3819.00	7
CHEST RES	17.53	1.11	3925.00	4115.00	
CHEST SI	30.45		3851.00	3970.00	
HEAD X	0.68	-4.78	3692.00	3938.00	2
HEAD Y	1.58	0.40	3963.00	3919.00	3
HEAD Z	14.05	-1.04	3912.00	3721.00	4
HEAD RES	14.20	0.51	3912.00	4196.00	
HEAD SI	23.08		3859.00	3986.00	
HEAD HIC	19.02		3889.00	3951.00	
LF SHOULDER	35.98	6.03	3923.00	4042.00	16
RT SHOULDER	58.54	7.59	3915.00	4062.00	17
TOTAL SHOULDER	91.13	15.07	3923.00	4061.00	
TOTAL SHO / WT	0.76	0.13	3923.00	4061.00	
LF LAP BELT	26.90	2.27	3994.00	3895.00	8
RT LAP BELT	44.63	5.06	3996.00	3896.00	9
TOTAL LAP	71.45	7.35	3995.00	3895.00	
TOTAL LAP / WT	0.60	0.06	3995.00	3895.00	
LF SEAT LNK X	25.74	-123.91	4155.00	3916.00	18
RT SEAT LNK X	31.16	-65.33	3881.00	3917.00	19
TOTAL SEAT X	19.33	-186.77	3989.00	3916.00	
SEAT LNK T	98.65	-20.66	3970.00	3857.00	35
LF SEAT PAN Z	348.77	13.49	3906.00	3621.00	11
RT SEAT PAN Z	989.68	16.45	3910.00	3652.00	12
CT SEAT PAN Z	586.42	3.90	3912.00	3629.00	13
TOTAL SEAT Z	1307.93	47.12	3910.00	3627.00	
TOTAL SEAT Z / WT	10.90	0.39	3910.00	3627.00	
RES SEAT FORCE	1319.64	47.20	3910.00	3627.00	
RES SEAT FORCE / WT	11.00	0.39	3910.00	3627.00	
LF FOOT X	11.59	-87.86	3851.00	3904.00	20
RT FOOT X	-0.48	-125.60	3851.00	3905.00	23
CT FOOT X	5.87	-137.24	3999.00	3904.00	26
TOTAL FOOT X	7.14	-345.34	3851.00	3905.00	
LF FOOT Y	97.53	-23.88	3889.00	3859.00	21
RT FOOT Y	28.06	-125.46	3703.00	3898.00	24
CT FOOT Y	55.94	-29.49	3872.00	3971.00	27
TOTAL FOOT Y	56.69	-55.20	3871.00	3909.00	
LF FOOT Z	153.87	-25.54	3890.00	3862.00	22
RT FOOT Z	148.16	-8.32	3896.00	3972.00	25
CT FOOT Z	142.31	-73.90	3894.00	3844.00	28
TOTAL FOOT Z	384.46	-43.61	3896.00	3972.00	
RES FOOT FORCE	487.16	17.98	3890.00	4162.00	

HEAD REST POS STUDY TEST: 408 SUBJ: K-1 WT: 175.0 G: 10 GP: 2 CELL: E

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	846.00	564.00	48
CARRIAGE X	1.48	-0.99	3818.00	3863.00	36
CARRIAGE Y	0.59	-0.67	3858.00	3806.00	31
CARRIAGE Z	11.82	-0.35	3849.00	3865.00	1
CARRIAGE Z (SM)	10.44	-0.11	3864.00	3623.00	
CARRIAGE VEL	-1.15	-25.89	4155.00	3816.00	29
SEAT X	1.45	-1.55	3819.00	3863.00	32
SEAT Y	1.20	-1.56	3815.00	3823.00	33
SEAT Z	11.59	-0.31	3856.00	3689.00	34
SEAT Z (SM)	10.54	-0.13	3857.00	3675.00	
CHEST X	5.61	-1.66	3872.00	3911.00	5
CHEST Y	-0.06	-2.87	3998.00	3877.00	6
CHEST Z	19.49	-1.27	3890.00	3691.00	7
CHEST RES	19.89	0.55	3890.00	3994.00	
CHEST SI	41.03		3823.00	3941.00	
HEAD X	0.38	-6.40	3684.00	3906.00	2
HEAD Y	2.08	-1.94	3924.00	3882.00	3
HEAD Z	12.93	-1.11	3874.00	3704.00	4
HEAD RES	13.28	0.62	3878.00	4172.00	
HEAD SI	29.50		3835.00	3952.00	
HEAD HIC	20.13		3851.00	3916.00	
LF SHOULDER	59.80	7.81	3891.00	3982.00	16
RT SHOULDER	92.27	-0.60	3890.00	3967.00	17
TOTAL SHOULDER	152.05	8.83	3890.00	3976.00	
TOTAL SHD / WT	0.87	0.05	3890.00	3976.00	
LF LAP BELT	62.58	37.27	3879.00	3994.00	8
RT LAP BELT	79.88	39.40	3952.00	3859.00	9
TOTAL LAP	134.94	77.91	3951.00	3858.00	
TOTAL LAP / WT	0.77	0.45	3951.00	3858.00	
LF SEAT LNK X	9.78	-295.99	4111.00	3872.00	18
RT SEAT LNK X	3.28	-155.69	3742.00	3873.00	19
TOTAL SEAT X	-5.96	-390.53	3618.00	3873.00	
SEAT LNK Y	48.31	-135.70	3959.00	3872.00	35
LF SEAT PAN Z	720.58	24.52	3872.00	3652.00	11
RT SEAT PAN Z	710.62	20.89	3873.00	3666.00	12
CT SEAT PAN Z	714.26	8.66	3874.00	3691.00	13
TOTAL SEAT Z	2125.62	65.38	3874.00	3605.00	
TOTAL SEAT Z / WT	12.15	0.37	3874.00	3605.00	
RES SEAT FORCE	2164.67	66.93	3874.00	3605.00	
RES SEAT FORCE / WT	12.37	0.38	3874.00	3605.00	
LF FOOT X	7.49	-119.09	3818.00	3866.00	20
RT FOOT X	12.16	-85.53	3818.00	3850.00	23
CT FOOT X	28.28	-147.02	3818.00	3863.00	26
TOTAL FOOT X	47.93	-338.36	3818.00	3866.00	
LF FOOT Y	139.65	-15.83	3851.00	4028.00	21
RT FOOT Y	21.01	-129.85	3818.00	3851.00	24
CT FOOT Y	14.44	-58.54	3905.00	3869.00	27
TOTAL FOOT Y	58.17	-67.47	3838.00	3869.00	
LF FOOT Z	146.39	-17.57	3852.00	3808.00	22
RT FOOT Z	186.48	-9.72	3852.00	4127.00	25
CT FOOT Z	188.32	-61.60	3872.00	3827.00	28
TOTAL FOOT Z	436.01	-33.09	3852.00	3808.00	
RES FOOT FORCE	522.58	17.98	3852.00	4127.00	

HEAD REST POS STUDY TEST: 439 SUBJ: M-2 WT: 164.0 G: 10 GP: 1 CELL: E

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.98	516.00	397.00	48
CARRIAGE X	1.05	-0.78	3910.00	3879.00	36
CARRIAGE Y	0.94	-0.75	3872.00	3887.00	31
CARRIAGE Z	12.03	-0.20	3903.00	3733.00	1
CARRIAGE Z (SM)	10.46	-0.09	3903.00	3733.00	
CARRIAGE VEL	-1.18	-25.61	4181.00	3865.00	29
SEAT X	1.17	-1.30	3874.00	3917.00	32
SEAT Y	0.87	-1.08	3868.00	3874.00	33
SEAT Z	12.07	-0.36	3909.00	3737.00	34
SEAT Z (SM)	10.65	-0.14	3910.00	3737.00	
CHEST X	0.93	-3.18	3979.00	3958.00	5
CHEST Y	-0.27	-2.21	3958.00	3938.00	6
CHEST Z	18.46	-0.93	3932.00	3832.00	7
CHEST RES	18.54	0.77	3932.00	3864.00	
CHEST SI	41.53		3875.00	3991.00	
HEAD X	0.94	-5.57	3830.00	3953.00	2
HEAD Y	1.29	-1.05	4000.00	3927.00	3
HEAD Z	13.99	-1.16	3921.00	3818.00	4
HEAD RES	13.42	0.57	3921.00	4200.00	
HEAD SI	18.68		3881.00	4006.00	
HEAD HIC	15.39		3903.00	3968.00	
LF SHOULDER	82.65	20.35	3945.00	3903.00	16
RT SHOULDER	117.35	35.62	3940.00	4070.00	17
TOTAL SHOULDER	197.82	56.81	3944.00	3905.00	
TOTAL SHD / WT	1.21	0.35	3944.00	3905.00	
LF LAP BELT	64.44	16.13	4015.00	3905.00	8
RT LAP BELT	82.76	18.25	4011.00	3911.00	9
TOTAL LAP	146.56	35.76	4014.00	3911.00	
TOTAL LAP / WT	0.89	0.22	4014.00	3911.00	
LF SEAT LNK X	37.37	-179.63	4138.00	3926.00	18
RT SEAT LNK X	10.71	-108.67	3873.00	3927.00	19
TOTAL SEAT X	28.01	-286.57	4006.00	3927.00	
SEAT LNK Y	70.85	-40.72	3979.00	3924.00	35
LF SEAT PAN Z	435.90	14.56	3926.00	3633.00	11
RT SEAT PAN Z	396.18	9.48	3926.00	3634.00	12
CT SEAT PAN Z	926.19	22.73	3925.00	3613.00	13
TOTAL SEAT Z	1756.02	63.24	3926.00	3610.00	
TOTAL SEAT Z / WT	10.71	0.39	3926.00	3610.00	
RES SEAT FORCE	1779.60	64.16	3926.00	3610.00	
RES SEAT FORCE / WT	10.85	0.39	3926.00	3610.00	
LF FOOT X	0.98	-104.81	3872.00	3918.00	20
RT FOOT X	-12.85	-189.96	3604.00	3920.00	23
CT FOOT X	-42.66	-218.86	4191.00	3921.00	26
TOTAL FOOT X	-85.04	-507.35	4179.00	3920.00	
LF FOOT Y	128.07	-30.03	3904.00	3875.00	21
RT FOOT Y	31.52	-150.40	3961.00	3913.00	24
CT FOOT Y	48.07	-41.70	3886.00	3914.00	27
TOTAL FOOT Y	57.58	-97.21	3886.00	3927.00	
LF FOOT Z	197.03	-0.69	3905.00	3876.00	22
RT FOOT Z	243.58	15.65	3929.00	4163.00	25
CT FOOT Z	154.26	-94.30	3910.00	3884.00	28
TOTAL FOOT Z	507.96	0.39	3912.00	3862.00	
RES FOOT FORCE	655.92	97.48	3921.00	4172.00	

HEAD REST POS STUDY TEST: 435 SUBJ: M11 WT: 157.0 G: 10 GP: 1 CELL: E

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.04	9.97	649.00	3914.00	48
CARRIAGE X	1.21	-1.11	3892.00	3860.00	36
CARRIAGE Y	0.70	-0.71	3896.00	3859.00	31
CARRIAGE Z	12.24	-0.18	3884.00	3723.00	1
CARRIAGE Z (SM)	10.47	-0.08	3885.00	3723.00	
CARRIAGE VEL	-1.09	-25.93	4175.00	3856.00	29
SEAT X	1.22	-1.56	3893.00	3898.00	32
SEAT Y	0.59	-0.75	4070.00	4060.00	33
SEAT Z	11.76	-0.23	3891.00	3712.00	34
SEAT Z (SM)	10.58	-0.13	3892.00	3711.00	
CHEST X	4.89	-2.28	3905.00	3940.00	5
CHEST Y	0.07	-2.26	3959.00	3908.00	6
CHEST Z	19.84	-0.87	3910.00	3710.00	7
CHEST RES	20.20	0.87	3910.00	3981.00	
CHEST SI	38.96		3849.00	3972.00	
HEAD X	1.67	-4.42	3895.00	3941.00	2
HEAD Y	1.41	-2.30	4026.00	3918.00	3
HEAD Z	12.67	-1.67	3910.00	4176.00	4
HEAD RES	12.83	0.66	3910.00	4200.00	
HEAD SI	21.16		3865.00	3967.00	
HEAD HIC	18.35		3884.00	3945.00	
LF SHOULDER	53.49	6.89	3925.00	4003.00	16
RT SHOULDER	88.73	11.89	3918.00	3977.00	17
TOTAL SHOULDER	137.90	21.31	3920.00	3978.00	
TOTAL SHD / WT	0.88	0.14	3920.00	3978.00	
LF LAP BELT	52.80	8.47	3999.00	3885.00	8
RT LAP BELT	67.26	11.54	3994.00	3895.00	9
TOTAL LAP	117.60	20.85	3997.00	3886.00	
TOTAL LAP / WT	0.75	0.13	3997.00	3886.00	
LF SEAT LNK X	-0.33	-190.88	4169.00	3912.00	18
RT SEAT LNK X	2.49	-128.03	3845.00	3907.00	19
TOTAL SEAT X	-4.61	-321.76	3736.00	3907.00	
SEAT LNK Y	21.71	-70.90	4154.00	3906.00	35
LF SEAT PAN Z	428.45	5.50	3910.00	3625.00	11
RT SEAT PAN Z	594.37	5.69	3910.00	3692.00	12
CT SEAT PAN Z	714.92	14.75	3914.00	3605.00	13
TOTAL SEAT Z	1730.17	41.33	3910.00	3618.00	
TOTAL SEAT Z / WT	11.02	0.26	3910.00	3618.00	
RES SEAT FORCE	1760.25	42.69	3910.00	3618.00	
RES SEAT FORCE / WT	11.21	0.27	3910.00	3618.00	
LF FOOT X	1.88	-177.14	3852.00	3903.00	20
RT FOOT X	18.99	-159.25	3852.00	3912.00	23
CT FOOT X	13.72	-187.52	3853.00	3912.00	26
TOTAL FOOT X	30.80	-517.70	3852.00	3903.00	
LF FOOT Y	147.70	-25.24	3886.00	4057.00	21
RT FOOT Y	22.68	-154.80	4088.00	3895.00	24
CT FOOT Y	25.58	-28.71	4020.00	3897.00	27
TOTAL FOOT Y	42.26	-60.20	3925.00	3880.00	
LF FOOT Z	210.00	-1.11	3886.00	4017.00	22
RT FOOT Z	246.66	-5.56	3912.00	4000.00	25
CT FOOT Z	106.77	-96.38	3851.00	3865.00	28
TOTAL FOOT Z	445.29	-42.56	3910.00	3861.00	
RES FOOT FORCE	674.68	90.24	3912.00	4000.00	

HEAD REST POS STUDY TEST: 434 SUBJ: M10 WT: 147.0 G: 10 GP: 2 CELL: E

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.98	9790.00	79.00	48
CARRIAGE X	1.56	-1.05	3905.00	3872.00	36
CARRIAGE Y	0.90	-0.82	3887.00	3872.00	31
CARRIAGE Z	12.28	-0.21	3898.00	3634.00	1
CARRIAGE Z (SM)	10.49	-0.10	3888.00	3633.00	
CARRIAGE VEL	-1.19	-25.99	4155.00	3859.00	29
SEAT X	1.16	-1.42	3907.00	3911.00	32
SEAT Y	1.09	-1.15	3864.00	3870.00	33
SEAT Z	12.07	-0.20	3904.00	3622.00	34
SEAT Z (SM)	10.70	-0.14	3905.00	3623.00	
CHEST X	4.62	-4.51	3920.00	3947.00	5
CHEST Y	-0.83	-4.24	4006.00	3923.00	6
CHEST Z	21.58	-1.04	3923.00	3626.00	7
CHEST RES	22.32	1.00	3923.00	4005.00	
CHEST SI	43.86		3861.00	3990.00	
HEAD X	3.18	-2.79	3918.00	3959.00	2
HEAD Y	1.18	-2.04	3968.00	3929.00	3
HEAD Z	15.42	-1.21	3918.00	4093.00	4
HEAD RES	15.76	0.39	3918.00	3866.00	
HEAD SI	27.64		3871.00	4007.00	
HEAD HIC	22.04		3897.00	3998.00	
LF SHOULDER	53.25	4.65	3942.00	4059.00	16
RT SHOULDER	43.48	3.52	3938.00	4057.00	17
TOTAL SHOULDER	96.14	8.43	3940.00	4057.00	
TOTAL SHD / WT	0.65	0.06	3940.00	4057.00	
LF LAP BELT	34.73	8.20	3941.00	3893.00	8
RT LAP BELT	53.35	11.30	4011.00	3906.00	9
TOTAL LAP	83.60	20.86	4012.00	3899.00	
TOTAL LAP / WT	0.57	0.14	4012.00	3899.00	
LF SEAT LNK X	13.58	-212.05	4162.00	3913.00	18
RT SEAT LNK X	7.57	-110.57	3971.00	3913.00	19
TOTAL SEAT X	2.02	-322.62	4177.00	3913.00	
SEAT LNK Y	32.81	-89.46	4118.00	3923.00	35
LF SEAT PAN Z	391.83	4.17	3914.00	3691.00	11
RT SEAT PAN Z	428.61	-0.85	3914.00	3633.00	12
CT SEAT PAN Z	900.70	13.48	3915.00	3633.00	13
TOTAL SEAT Z	1719.42	25.94	3914.00	3633.00	
TOTAL SEAT Z / WT	11.70	0.18	3914.00	3633.00	
RES SEAT FORCE	1751.04	28.13	3914.00	3633.00	
RES SEAT FORCE / WT	11.91	0.19	3914.00	3633.00	
LF FOOT X	5.12	-78.06	3863.00	3913.00	20
RT FOOT X	8.59	-134.40	3802.00	3915.00	23
CT FOOT X	12.84	-150.83	3864.00	3918.00	26
TOTAL FOOT X	13.94	-359.69	3863.00	3915.00	
LF FOOT Y	102.09	-26.31	3899.00	4053.00	21
RT FOOT Y	16.54	-154.73	3878.00	3908.00	24
CT FOOT Y	59.29	-22.59	3882.00	3858.00	27
TOTAL FOOT Y	80.98	-65.93	3879.00	3873.00	
LF FOOT Z	172.85	-42.85	3925.00	3872.00	22
RT FOOT Z	157.57	-22.08	3910.00	3877.00	25
CT FOOT Z	187.32	-51.89	3907.00	3856.00	28
TOTAL FOOT Z	459.30	-59.94	3908.00	3856.00	
RES FOOT FORCE	520.54	34.99	3910.00	4191.00	

HEAD REST POS STUDY TEST: 438 SUBJ: M13 WT: 171.0 G: 10 GP: 1 CELL: E

DATA ID	MAX	MIN	T1	T2	CH
IGV EXT PWR	10.05	9.98	81.00	10.00	48
CARRIAGE X	1.36	-0.94	3841.00	3854.00	36
CARRIAGE Y	1.29	-0.59	3882.00	3855.00	31
CARRIAGE Z	12.04	-0.28	3874.00	3794.00	1
CARRIAGE Z (SM)	10.95	-0.10	3874.00	3796.00	
CARRIAGE VEL	-1.12	-25.61	4181.00	3831.00	29
SEAT X	1.20	-1.37	3921.00	3887.00	32
SEAT Y	0.64	-0.92	3855.00	3847.00	33
SEAT Z	11.99	-0.15	3881.00	3714.00	34
SEAT Z (SM)	10.75	-0.10	3881.00	3717.00	
CHEST X	2.83	-2.43	3892.00	3928.00	5
CHEST Y	0.06	-1.96	3886.00	3892.00	6
CHEST Z	25.92	-0.65	3902.00	3807.00	7
CHEST RES	25.93	0.29	3902.00	3985.00	
CHEST SI	47.54		3841.00	3978.00	
HEAD X	0.64	-4.37	3701.00	3928.00	2
HEAD Y	2.17	0.33	3992.00	3916.00	3
HEAD Z	16.20	-1.16	3894.00	3633.00	4
HEAD RES	16.29	1.18	3894.00	4199.00	
HEAD SI	26.51		3855.00	4097.00	
HEAD HIC	19.63		3873.00	3935.00	
LF SHOULDER	101.26	30.58	3909.00	3974.00	16
RT SHOULDER	111.17	5.59	3909.00	3978.00	17
TOTAL SHOULDER	212.49	38.37	3909.00	3975.00	
TOTAL SHD / WT	1.24	0.21	3909.00	3975.00	
LF LAP BELT	55.07	6.68	3987.00	3882.00	8
RT LAP BELT	73.74	14.57	3984.00	3880.00	9
TOTAL LAP	127.99	21.72	3985.00	3881.00	
TOTAL LAP / WT	0.75	0.13	3985.00	3881.00	
LF SEAT LNK X	12.66	-212.97	4117.00	3890.00	18
RT SEAT LNK X	-8.45	-181.49	3653.00	3888.00	19
TOTAL SEAT X	-4.62	-393.89	4184.00	3888.00	
SEAT LNK Y	48.70	-37.86	3957.00	3892.00	95
LF SEAT PAN Z	346.10	-0.61	3890.00	3609.00	11
RT SEAT PAN Z	476.13	7.91	3892.00	3768.00	12
CT SEAT PAN Z	924.48	9.09	3892.00	3610.00	13
TOTAL SEAT Z	1738.30	31.35	3892.00	3616.00	
TOTAL SEAT Z / WT	10.17	0.18	3892.00	3616.00	
RES SEAT FORCE	1780.04	43.57	3892.00	3818.00	
RES SEAT FORCE / WT	10.41	0.25	3892.00	3816.00	
LF FOOT X	-29.72	-158.44	3841.00	3891.00	20
RT FOOT X	-10.01	-120.16	3947.00	3891.00	23
CT FOOT X	-90.21	-182.28	3840.00	3900.00	26
TOTAL FOOT X	-70.18	-453.70	3842.00	3891.00	
LF FOOT Y	142.34	-29.73	3876.00	3831.00	21
RT FOOT Y	24.90	-129.51	3784.00	3876.00	24
CT FOOT Y	26.08	-47.78	3690.00	3884.00	27
TOTAL FOOT Y	44.25	-54.80	3839.00	3884.00	
LF FOOT Z	215.82	7.40	3901.00	3832.00	22
RT FOOT Z	232.32	24.57	3899.00	3931.00	25
CT FOOT Z	145.44	-141.71	3896.00	3852.00	28
TOTAL FOOT Z	520.13	-57.81	3899.00	3832.00	
RES FOOT FORCE	671.56	113.44	3901.00	4133.00	

HEAD REST POS STUDY TEST: 416 SUBJ: R-2 WT: 145.0 G: 10 GP: 1 CELL: E

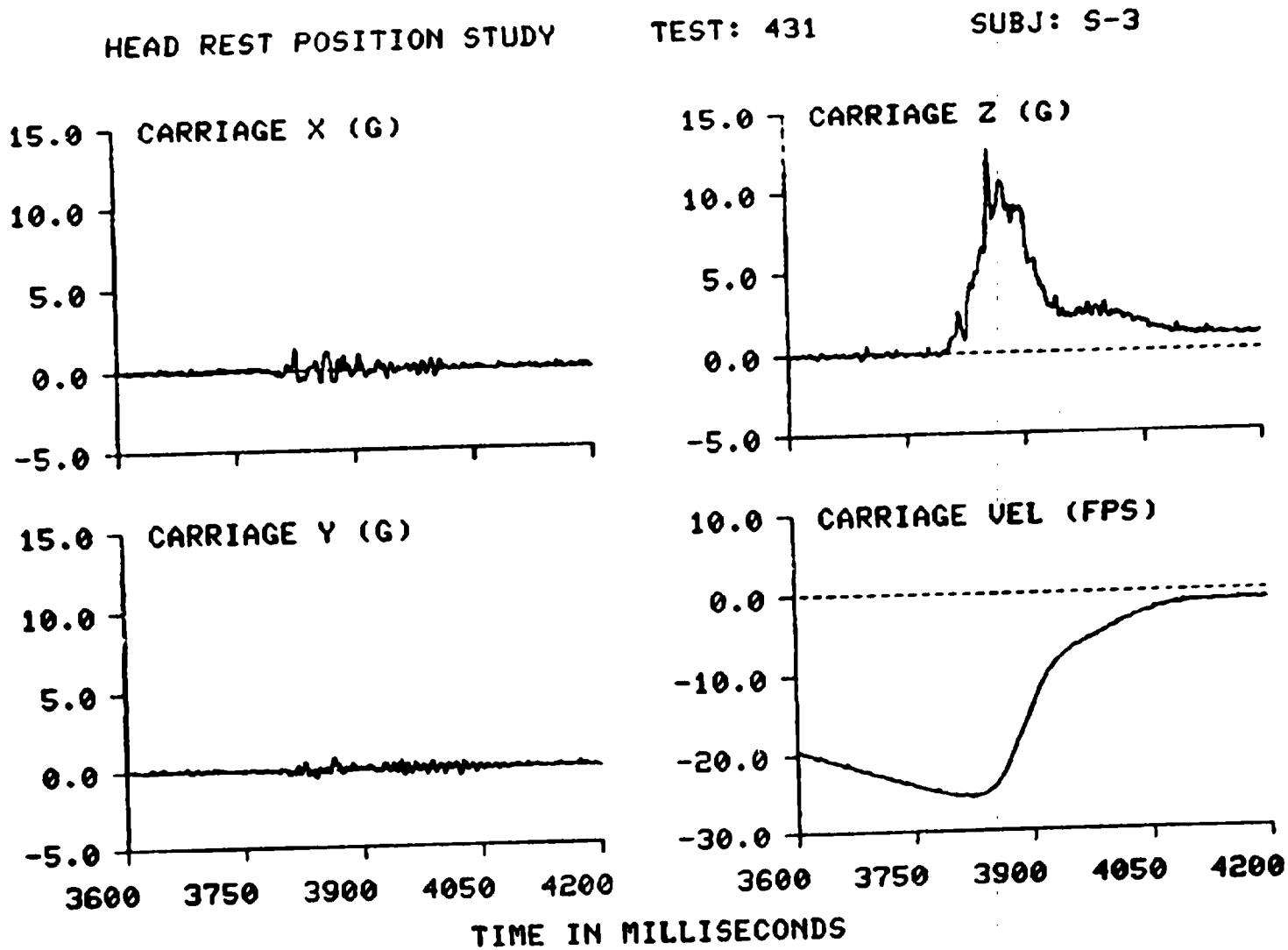
DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	1441.00	318.00	48
CARRIAGE X	1.61	-1.05	3918.00	3890.00	36
CARRIAGE Y	0.56	-0.98	3918.00	3891.00	31
CARRIAGE Z	12.25	-0.21	3911.00	3645.00	1
CARRIAGE Z (SM)	10.59	-0.10	3912.00	3684.00	
CARRIAGE VEL	-1.03	-25.62	4197.00	3878.00	29
SEAT X	1.36	-1.36	3918.00	3924.00	32
SEAT Y	0.87	-0.86	3875.00	3883.00	33
SEAT Z	11.29	-0.27	3918.00	3653.00	34
SEAT Z (SM)	10.65	-0.17	3918.00	3722.00	
CHEST X	2.58	-1.09	3929.00	3967.00	5
CHEST Y	-0.28	-2.71	3920.00	3949.00	6
CHEST Z	18.21	-1.10	3937.00	3678.00	7
CHEST RES	18.42	0.72	3937.00	3869.00	
CHEST SI	33.47		3877.00	4010.00	
HEAD X	0.39	-4.91	3853.00	3970.00	2
HEAD Y	0.95	-1.21	3766.00	3956.00	3
HEAD Z	14.86	-0.59	3929.00	3758.00	4
HEAD RES	14.93	0.64	3929.00	3719.00	
HEAD SI	23.65		3883.00	4146.00	
HEAD HIC	17.05		3909.00	3956.00	
LF SHOULDER	59.32	19.18	3947.00	3915.00	16
RT SHOULDER	39.66	11.27	3958.00	3913.00	17
TOTAL SHOULDER	95.47	30.68	3949.00	3913.00	
TOTAL SHD / WT	0.66	0.21	3949.00	3913.00	
LF LAP BELT	40.38	8.52	4012.00	3913.00	8
RT LAP BELT	62.69	15.29	4008.00	3920.00	9
TOTAL LAP	102.95	25.65	4008.00	3913.00	
TOTAL LAP / WT	0.71	0.18	4008.00	3913.00	
LF SEAT LNK X	38.42	-140.02	4151.00	3924.00	18
RT SEAT LNK X	26.83	-82.03	3985.00	3933.00	19
TOTAL SEAT X	48.53	-210.54	3998.00	3933.00	
SEAT LNK Y	58.66	-7.51	3975.00	3501.00	35
LF SEAT PAN Z	282.97	3.66	3926.00	3618.00	11
RT SEAT PAN Z	415.80	1.84	3935.00	3656.00	12
CT SEAT PAN Z	1020.30	39.01	3934.00	3604.00	13
TOTAL SEAT Z	1679.60	60.77	3934.00	3625.00	
TOTAL SEAT Z / WT	11.58	0.42	3934.00	3625.00	
RES SEAT FORCE	1692.18	60.83	3934.00	3625.00	
RES SEAT FORCE / WT	11.67	0.42	3934.00	3625.00	
LF FOOT X	9.46	-168.66	3878.00	3928.00	20
RT FOOT X	18.01	-136.19	3878.00	3929.00	23
CT FOOT X	81.11	-197.38	3879.00	3930.00	28
TOTAL FOOT X	79.67	-496.83	3879.00	3929.00	
LF FOOT Y	130.11	-14.88	3914.00	4135.00	21
RT FOOT Y	25.10	-124.88	4119.00	3922.00	24
CT FOOT Y	29.40	-50.69	3899.00	3927.00	27
TOTAL FOOT Y	88.65	-81.02	3898.00	3943.00	
LF FOOT Z	173.02	-32.74	3915.00	3870.00	22
RT FOOT Z	203.02	-27.68	3930.00	3894.00	25
CT FOOT Z	133.34	-85.07	3933.00	3870.00	28
TOTAL FOOT Z	435.55	-104.40	3915.00	3870.00	
RES FOOT FORCE	624.39	32.16	3930.00	3722.00	

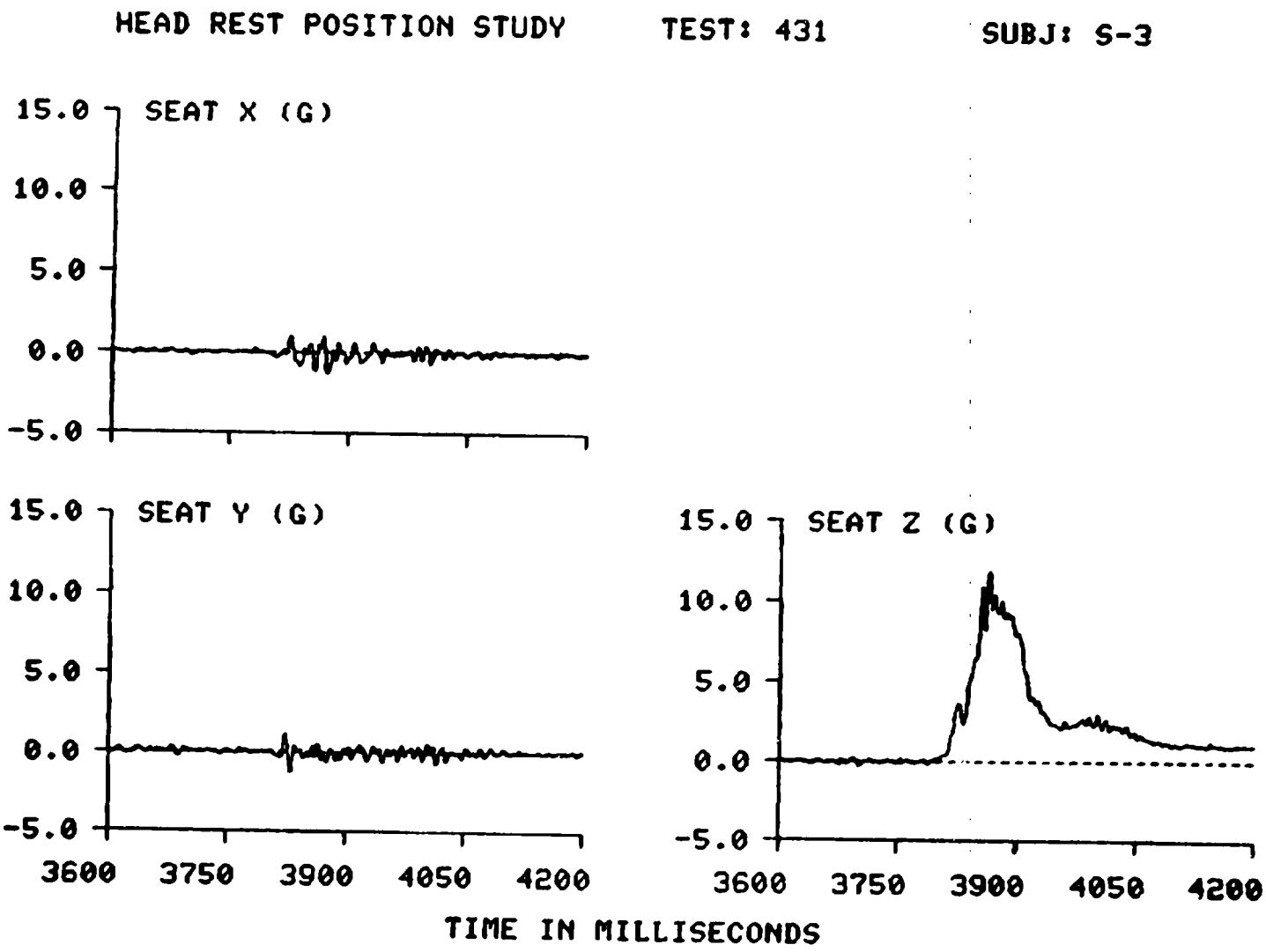
HEAD REST POS STUDY TEST: 442 SUBJ: A-3 WT: 146.0 G: 10 GP: 2 CELL: E

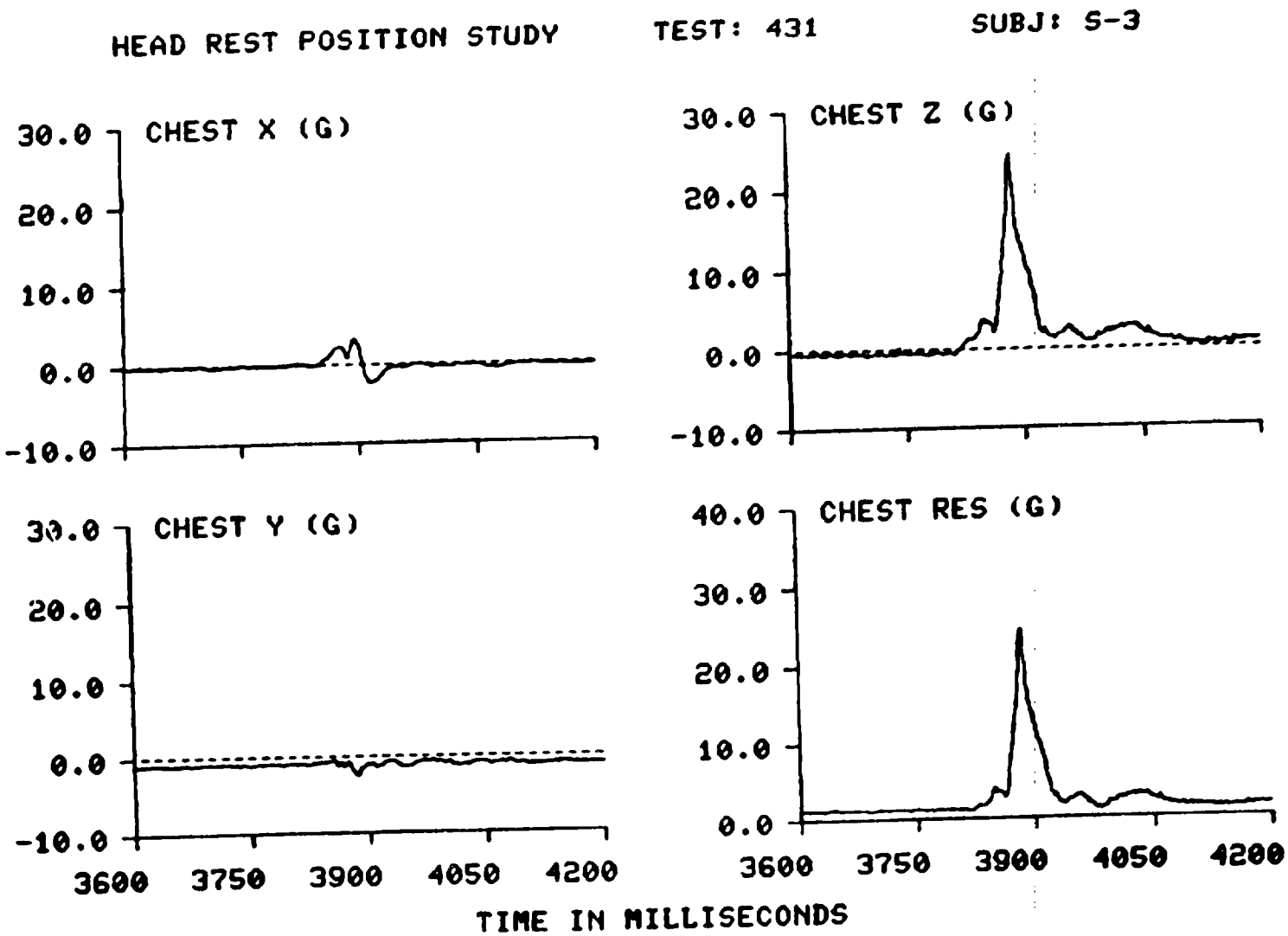
DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.02	9.97	63.00	4083.00	48
CARRIAGE X	1.59	-1.08	3870.00	3936.00	36
CARRIAGE Y	0.93	-0.44	3869.00	3887.00	31
CARRIAGE Z	12.01	-0.19	3863.00	3658.00	1
CARRIAGE Z (SM)	10.58	-0.09	3863.00	3659.00	
CARRIAGE VEL	-0.98	-26.00	4197.00	3829.00	29
SEAT X	1.70	-1.38	3829.00	3877.00	32
SEAT Y	0.80	-0.93	3937.00	3878.00	33
SEAT Z	12.21	-0.21	3869.00	3677.00	34
SEAT Z (SM)	10.99	-0.12	3870.00	3678.00	
CHEST X	4.41	-1.18	3893.00	3923.00	5
CHEST Y	-0.84	-3.25	3875.00	3883.00	6
CHEST Z	15.49	-0.86	3882.00	3854.00	7
CHEST RES	16.17	1.28	3882.00	4112.00	
CHEST SI	32.26		3831.00	3954.00	
HEAD X	0.47	-4.54	3826.00	3929.00	2
HEAD Y	2.16	0.60	3886.00	3913.00	3
HEAD Z	14.93	-0.88	3884.00	3771.00	4
HEAD RES	14.56	1.14	3886.00	3831.00	
HEAD SI	22.47		3835.00	4061.00	
HEAD HIC	15.66		3861.00	3906.00	
LF SHOULDER	72.95	16.68	3922.00	4010.00	16
RT SHOULDER	105.95	22.05	3920.00	4029.00	17
TOTAL SHOULDER	178.36	42.13	3921.00	4021.00	
TOTAL SHD / WT	1.22	0.29	3921.00	4021.00	
LF LAP BELT	54.02	28.75	3956.00	3872.00	8
RT LAP BELT	71.37	32.83	3957.00	3871.00	9
TOTAL LAP	125.91	61.61	3956.00	3872.00	
TOTAL LAP / WT	0.86	0.42	3956.00	3872.00	
LF SEAT LNK X	91.76	-166.82	4152.00	3879.00	18
RT SEAT LNK X	9.50	-93.61	3830.00	3885.00	19
TOTAL SEAT X	16.20	-255.70	3976.00	3884.00	
SEAT LNK Y	97.56	-91.97	3972.00	3882.00	35
LF SEAT PAN Z	430.84	16.63	3880.00	3617.00	11
RT SEAT PAN Z	456.08	29.15	3881.00	3600.00	12
CT SEAT PAN Z	783.78	39.50	3883.00	3655.00	13
TOTAL SEAT Z	1657.83	93.05	3882.00	3600.00	
TOTAL SEAT Z / WT	11.36	0.64	3882.00	3600.00	
RES SEAT FORCE	1679.09	94.24	3882.00	3600.00	
RES SEAT FORCE / WT	11.50	0.65	3882.00	3600.00	
LF FOOT X	6.49	-120.99	3829.00	3879.00	20
RT FOOT X	22.63	-55.68	3868.00	3876.00	23
CT FOOT X	72.66	-104.43	3830.00	3876.00	26
TOTAL FOOT X	77.95	-270.62	3830.00	3879.00	
LF FOOT Y	116.91	-16.74	3865.00	3837.00	21
RT FOOT Y	20.85	-74.10	3925.00	3866.00	24
CT FOOT Y	17.21	-59.32	3992.00	3882.00	27
TOTAL FOOT Y	40.72	-55.69	3849.00	3882.00	
LF FOOT Z	138.60	-26.22	3873.00	3967.00	22
RT FOOT Z	123.35	-40.46	3866.00	3977.00	25
CT FOOT Z	148.43	-110.56	3871.00	3839.00	28
TOTAL FOOT Z	337.16	-125.92	3873.00	3838.00	
RES FOOT FORCE	386.88	2.70	3869.00	3814.00	

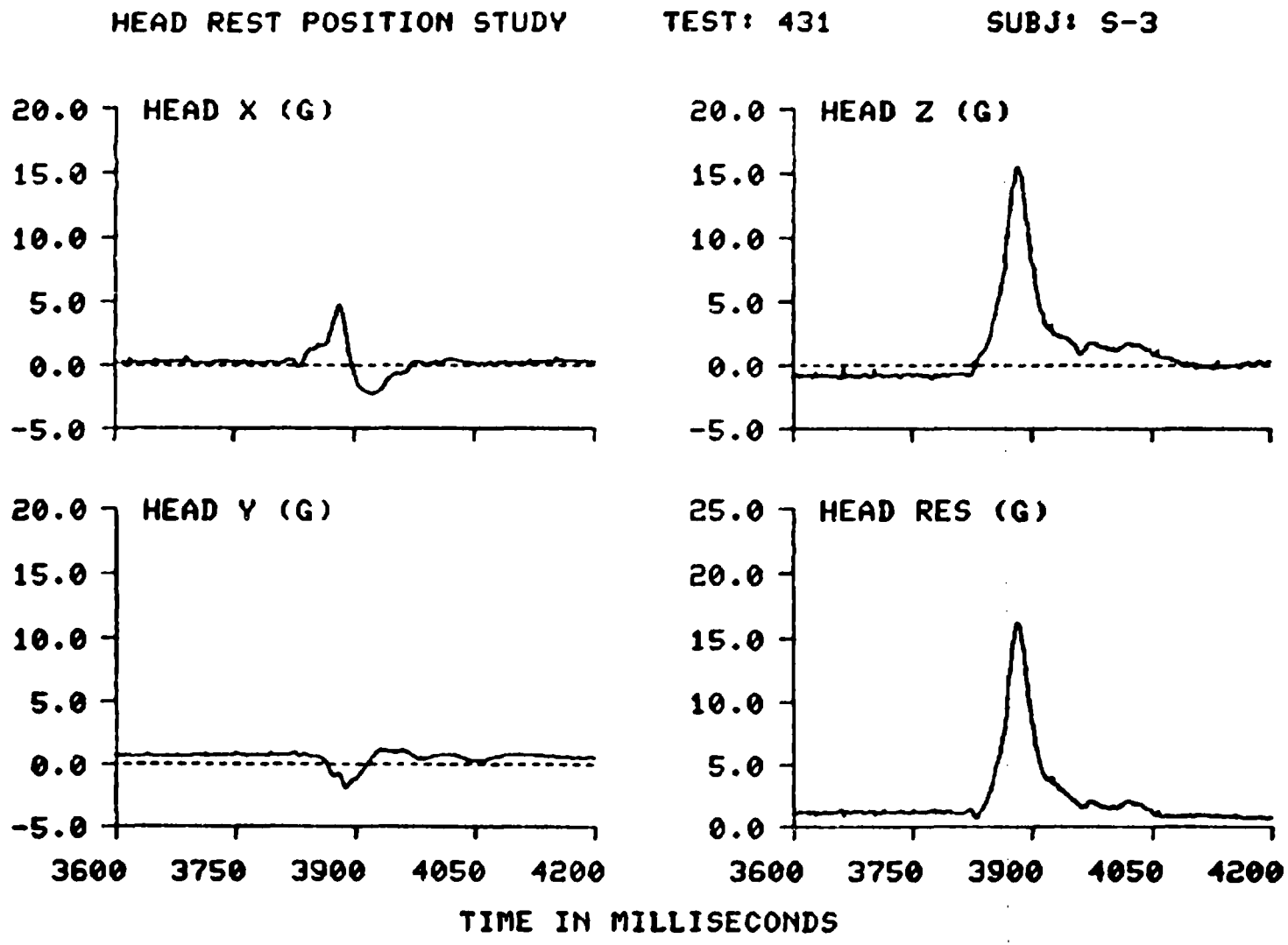
HEAD REST POS STUDY TEST: 431 SUBJ: S-9 WT: 166.0 G: 10 GP: 2 CELL: E

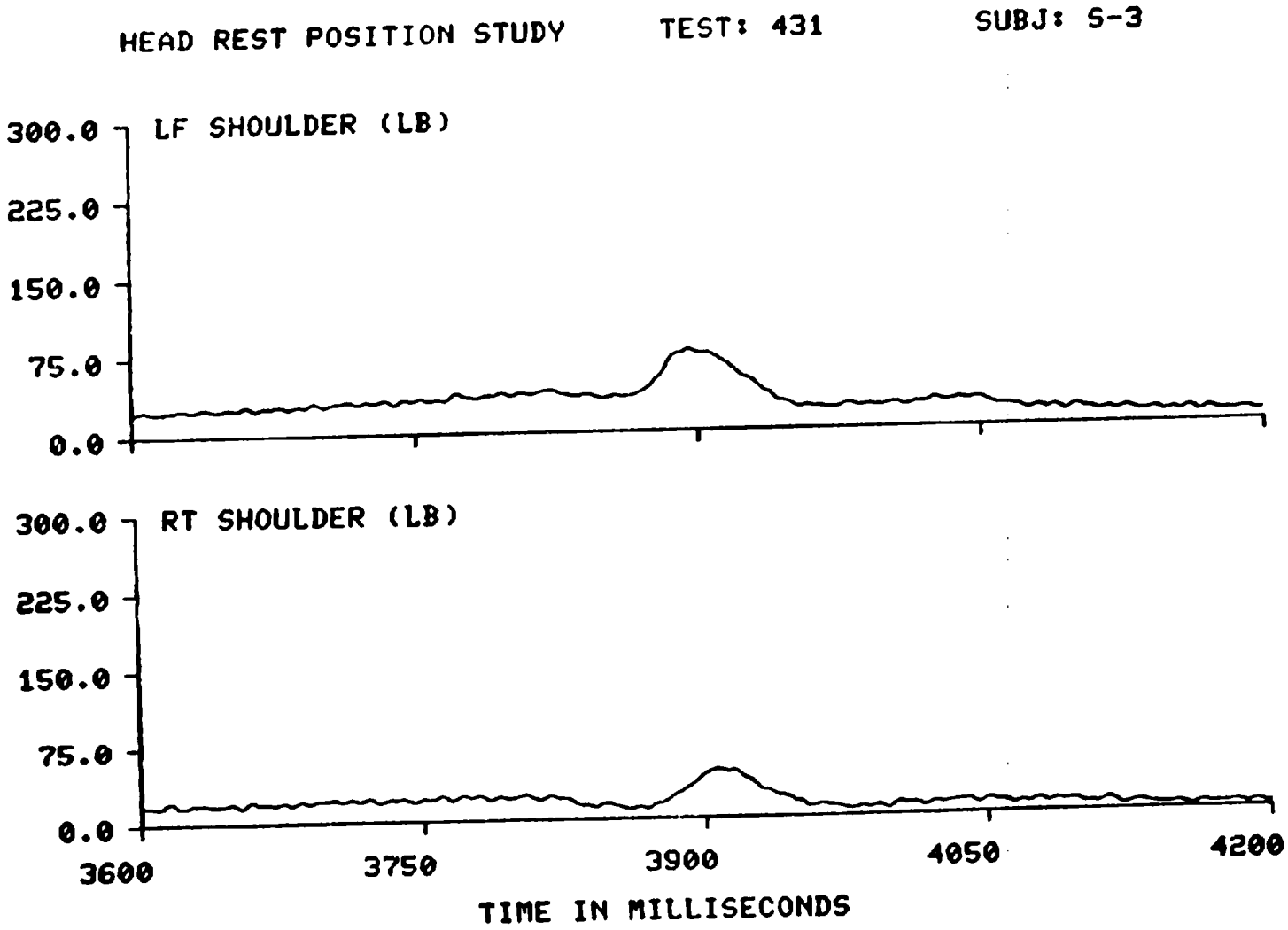
DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.04	9.98	159.00	24.00	48
CARRIAGE X	1.39	-0.79	3825.00	3857.00	36
CARRIAGE Y	0.78	-0.58	3883.00	3840.00	31
CARRIAGE Z	12.57	-0.29	3858.00	3694.00	1
CARRIAGE Z (SM)	10.60	-0.13	3858.00	3694.00	
CARRIAGE VEL	-0.89	-25.78	4164.00	3821.00	29
SEAT X	1.02	-1.32	3867.00	3872.00	32
SEAT Y	1.18	-1.28	3829.00	3831.00	33
SEAT Z	11.80	-0.30	3864.00	3701.00	34
SEAT Z (SM)	10.61	-0.20	3865.00	3702.00	
CHEST X	3.26	-2.31	3893.00	3915.00	5
CHEST Y	-0.53	-2.50	3982.00	3885.00	6
CHEST Z	24.40	-0.74	3884.00	3701.00	7
CHEST RES	24.54	0.96	3884.00	4144.00	
CHEST SI	49.93		3827.00	3874.00	
HEAD X	4.71	-2.25	3879.00	3920.00	2
HEAD Y	1.19	-1.96	3937.00	3887.00	3
HEAD Z	15.53	-1.09	3881.00	3774.00	4
HEAD RES	16.26	0.57	3881.00	4193.00	
HEAD SI	25.14		3839.00	3960.00	
HEAD HIC	20.26		3863.00	3904.00	
LF SHOULDER	77.40	13.00	3896.00	4095.00	16
RT SHOULDER	47.11	5.59	3907.00	3997.00	17
TOTAL SHOULDER	121.02	24.24	3906.00	4095.00	
TOTAL SHD / WT	0.73	0.15	3906.00	4095.00	
LF LAP BELT	40.94	14.01	3921.00	3864.00	8
RT LAP BELT	46.12	12.15	3949.00	3867.00	9
TOTAL LAP	80.48	27.87	3955.00	3865.00	
TOTAL LAP / WT	0.48	0.17	3955.00	3865.00	
LF SEAT LNK X	17.65	-213.17	4113.00	3874.00	18
RT SEAT LNK X	-3.84	-159.09	3671.00	3876.00	19
TOTAL SEAT X	-0.69	-370.49	4139.00	3875.00	
SEAT LNK Y	32.49	-89.12	4013.00	3888.00	35
LF SEAT PAN Z	504.59	18.99	3882.00	3808.00	11
RT SEAT PAN Z	543.27	17.80	3877.00	3798.00	12
CT SEAT PAN Z	847.06	9.76	3881.00	3602.00	13
TOTAL SEAT Z	1884.95	64.81	3878.00	3602.00	
TOTAL SEAT Z / WT	11.98	0.39	3878.00	3602.00	
RES SEAT FORCE	1921.48	68.44	3878.00	3602.00	
RES SEAT FORCE / WT	11.58	0.41	3878.00	3602.00	
LF FOOT X	5.75	-123.54	3825.00	3886.00	20
RT FOOT X	11.37	-75.87	3822.00	3875.00	23
CT FOOT X	59.44	-148.96	3826.00	3884.00	26
TOTAL FOOT X	64.17	-295.48	3825.00	3886.00	
LF FOOT Y	111.79	-27.97	3860.00	4034.00	21
RT FOOT Y	18.51	-88.87	3825.00	3860.00	24
CT FOOT Y	42.75	-65.82	4003.00	3870.00	27
TOTAL FOOT Y	40.20	-52.80	3846.00	3870.00	
LF FOOT Z	175.45	-40.16	3886.00	3855.00	22
RT FOOT Z	132.96	-29.06	3861.00	3997.00	25
CT FOOT Z	932.07	-74.08	3882.00	3834.00	28
TOTAL FOOT Z	514.97	-65.69	3885.00	3834.00	
RES FOOT FORCE	591.18	14.87	3885.00	4098.00	

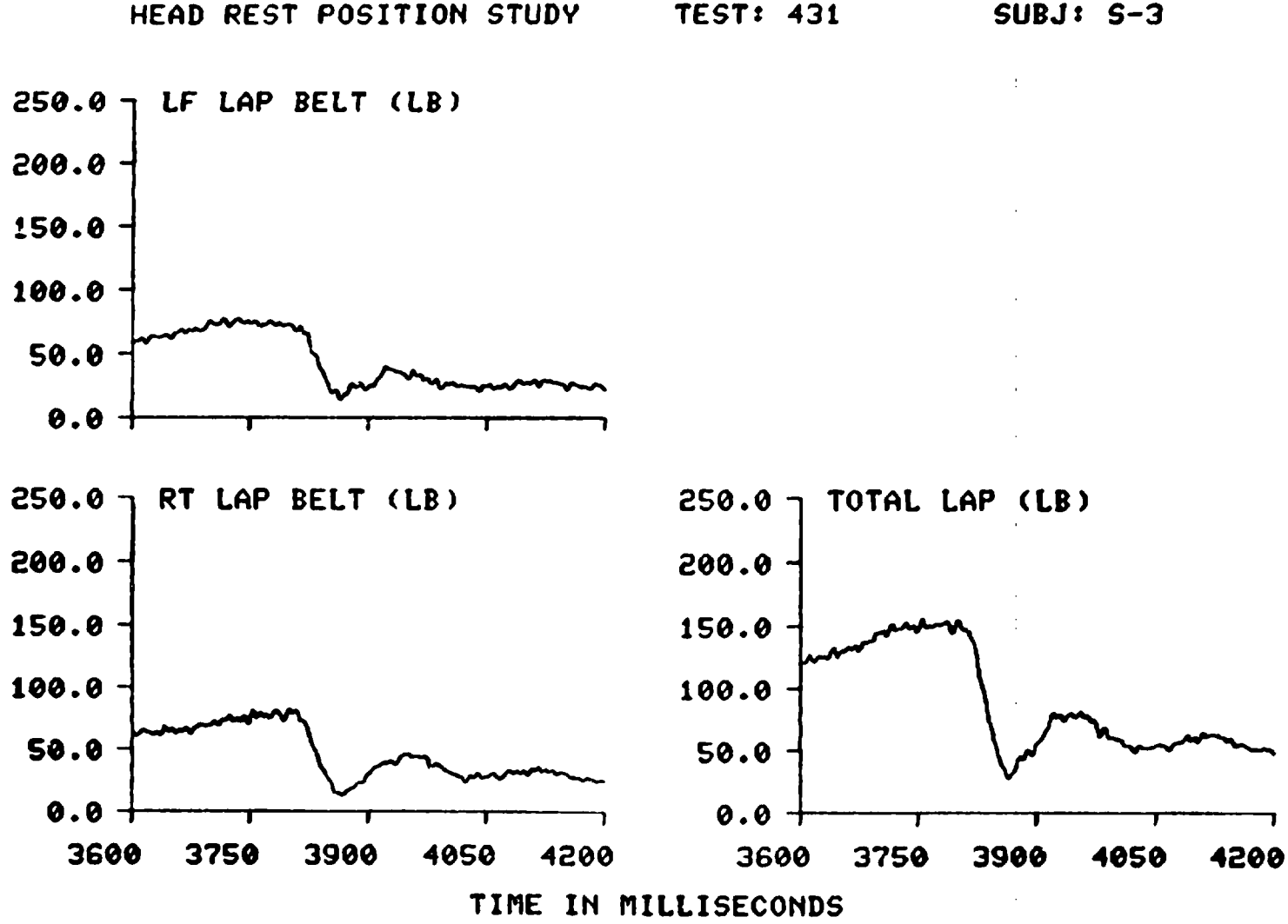

HEAD REST POSITION STUDY
TEST: 431
SUBJ: S-3
CARRIAGE X (G)
15.0
10.0
5.0
0.0
-5.0
CARRIAGE Z (G)
15.0
10.0
5.0
0.0
-5.0
CARRIAGE Y (G)
15.0
10.0
5.0
0.0
-5.0
CARRIAGE VEL (FPS)
10.0
0.0
-10.0
-20.0
-30.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

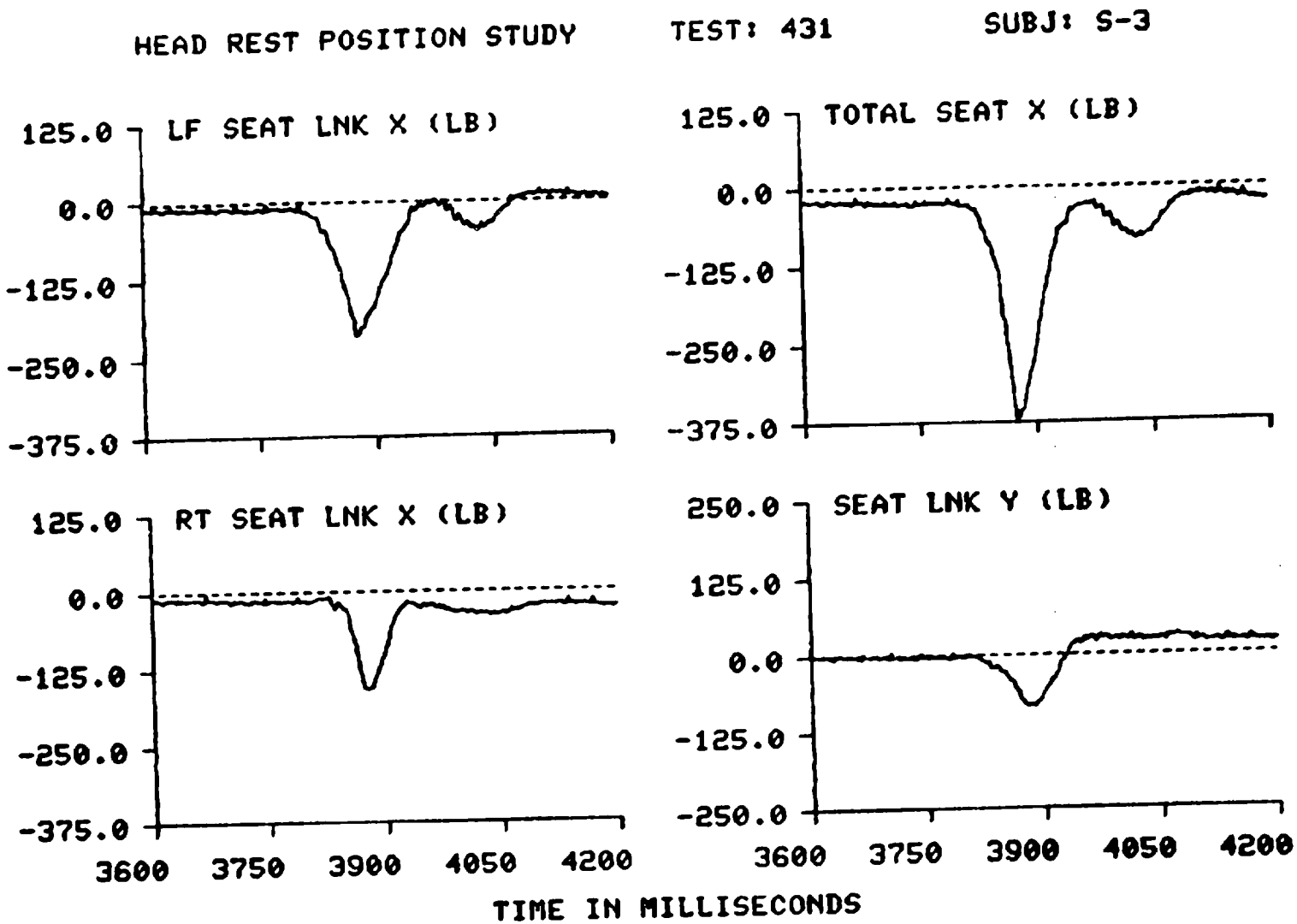

HEAD REST POSITION STUDY
TEST: 431
SUBJ: S-3
SEAT X (G)
15.0
10.0
5.0
0.0
-5.0
SEAT Y (G)
SEAT Z (G)
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

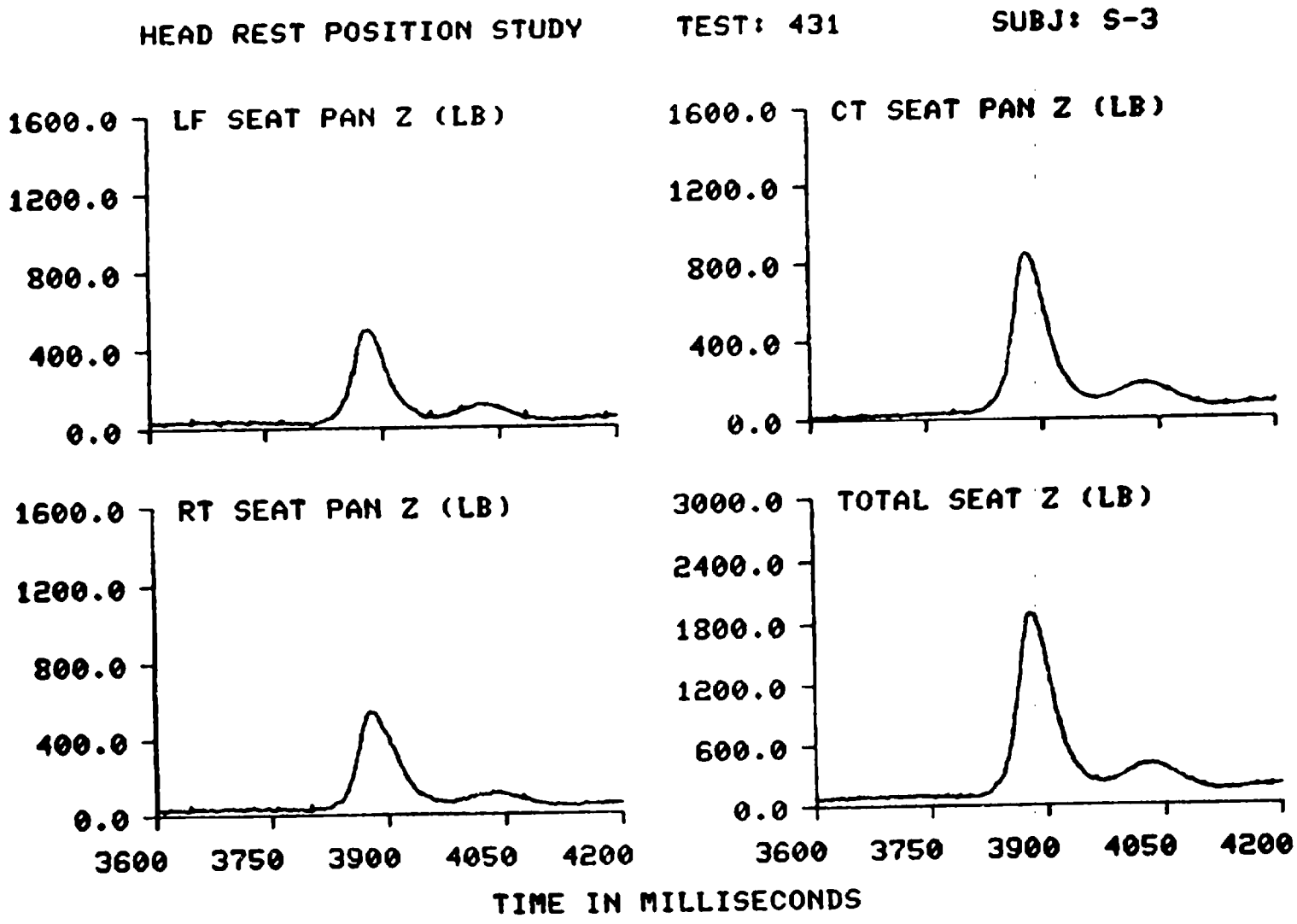

HEAD REST POSITION STUDY
TEST: 431
SUBJ: S-3
CHEST X (G)
CHEST Z (G)
CHEST Y (G)
CHEST RES (G)
30.0
20.0
10.0
0.0
-10.0
40.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

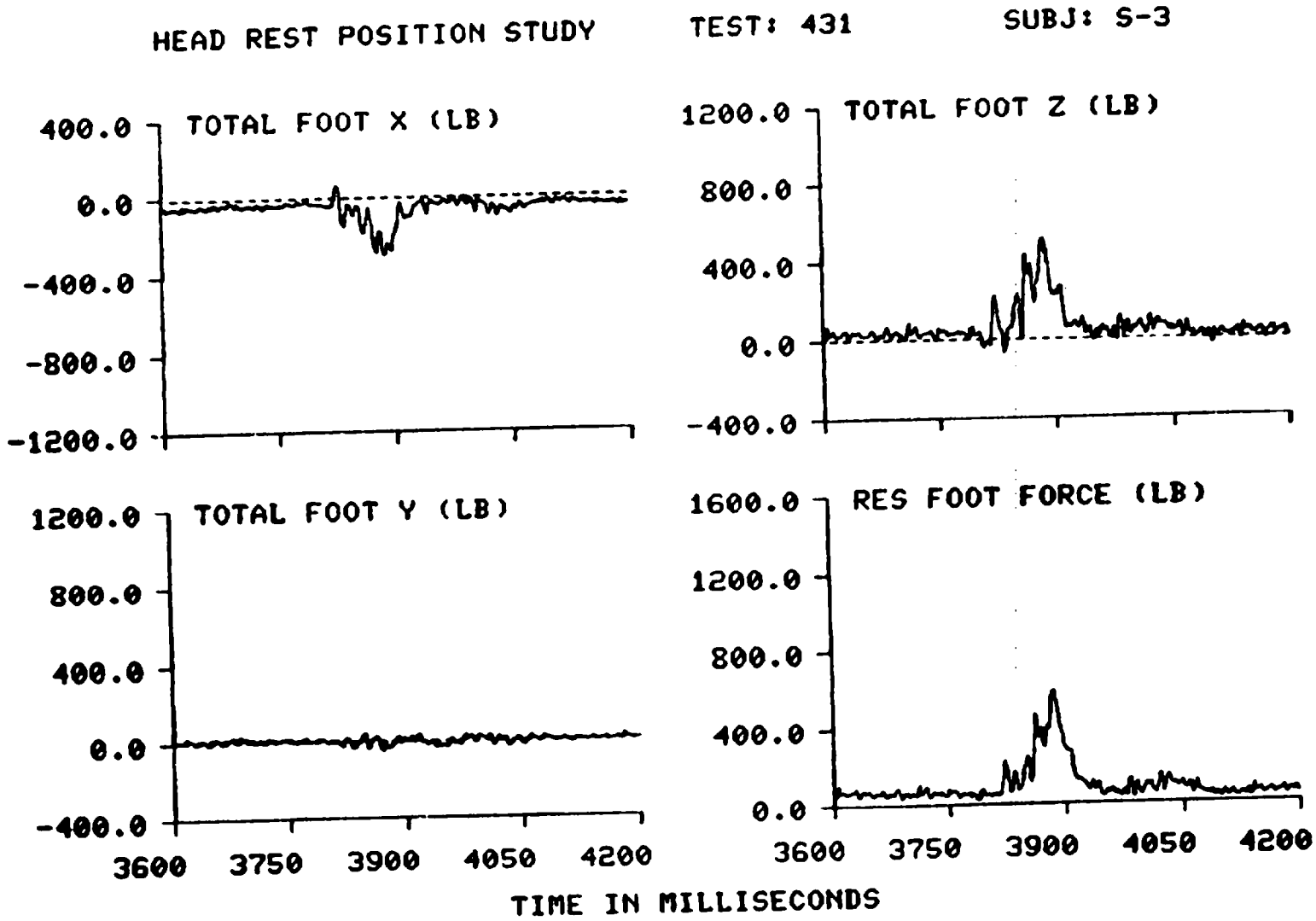

HEAD REST POSITION STUDY
TEST: 431
SUBJ: S-3
HEAD X (G)
HEAD Z (G)
HEAD Y (G)
HEAD RES (G)
20.0
15.0
10.0
5.0
0.0
-5.0
25.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 431
SUBJ: S-3
LF SHOULDER (LB)
300.0
225.0
150.0
75.0
0.0
RT SHOULDER (LB)
300.0
225.0
150.0
75.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 431
SUBJ: S-3
LF LAP BELT (LB)
RT LAP BELT (LB)
TOTAL LAP (LB)
250.0
200.0
150.0
100.0
50.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 431
SUBJ: S-3
LF SEAT LNK X (LB)
TOTAL SEAT X (LB)
RT SEAT LNK X (LB)
SEAT LNK Y (LB)
125.0
0.0
-125.0
-250.0
-375.0
250.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 431
SUBJ: S-3
LF SEAT PAN Z (LB)
CT SEAT PAN Z (LB)
RT SEAT PAN Z (LB)
TOTAL SEAT Z (LB)
1600.0
1200.0
800.0
400.0
0.0
3000.0
2400.0
1800.0
600.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 431
SUBJ: S-3
TOTAL FOOT X (LB)
400.0
0.0
-400.0
-800.0
-1200.0
TOTAL FOOT Z (LB)
1200.0
800.0
400.0
0.0
-400.0
TOTAL FOOT Y (LB)
1200.0
800.0
400.0
0.0
-400.0
RES FOOT FORCE (LB)
1600.0
1200.0
800.0
400.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

HEAD REST POS STUDY TEST: 415 SUBJ: 0-1 WT: 209.0 G: 10 GP: 1 CELL: F

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	1167.00	97.00	48
CARRIAGE X	1.60	-1.17	3888.00	3681.00	36
CARRIAGE Y	0.56	-0.50	3887.00	3958.00	31
CARRIAGE Z	12.72	-0.30	3881.00	3796.00	1
CARRIAGE Z (SM)	10.47	-0.19	3881.00	3671.00	
CARRIAGE VEL	-1.00	-25.34	4190.00	3841.00	29
SEAT X	1.17	-1.57	3876.00	3881.00	32
SEAT Y	0.98	-1.15	3845.00	3852.00	33
SEAT Z	11.72	-0.23	3888.00	3663.00	34
SEAT Z (SM)	10.74	-0.11	3889.00	3664.00	
CHEST X	6.50	-1.49	3902.00	3933.00	5
CHEST Y	-0.15	-2.59	3984.00	3906.00	6
CHEST Z	20.03	-0.80	3906.00	3976.00	7
CHEST RES	21.02	0.40	3905.00	3606.00	
CHEST SI	41.85		3847.00	3984.00	
HEAD X	5.22	-0.16	3902.00	3939.00	2
HEAD Y	1.83	-0.06	3958.00	3917.00	3
HEAD Z	13.68	-0.94	3899.00	3721.00	4
HEAD RES	14.56	0.90	3899.00	4176.00	
HEAD SI	25.33		3859.00	3981.00	
HEAD HIC	21.78		3879.00	3942.00	
LF SHOULDER	98.04	21.47	3917.00	4092.00	16
RT SHOULDER	85.87	5.92	3923.00	4075.00	17
TOTAL SHOULDER	161.07	27.98	3921.00	4075.00	
TOTAL SHD / WT	0.77	0.13	3921.00	4075.00	
LF LAP BELT	60.05	19.48	3983.00	3887.00	8
RT LAP BELT	67.14	29.02	3995.00	3890.00	9
TOTAL LAP	125.18	48.99	3995.00	3888.00	
TOTAL LAP / WT	0.60	0.23	3995.00	3888.00	
LF SEAT LNK X	95.28	-200.71	4112.00	3896.00	18
RT SEAT LNK X	20.21	-83.08	3970.00	3896.00	19
TOTAL SEAT X	47.93	-283.79	3980.00	3896.00	
SEAT LNK Y	59.02	-66.28	3963.00	3895.00	35
LF SEAT PAN Z	525.79	9.11	3898.00	3644.00	11
RT SEAT PAN Z	507.99	10.51	3904.00	3606.00	12
CT SEAT PAN Z	1249.34	38.38	3900.00	3625.00	13
TOTAL SEAT Z	2275.22	72.58	3899.00	3627.00	
TOTAL SEAT Z / WT	10.89	0.35	3899.00	3627.00	
RES SEAT FORCE	2292.45	73.32	3899.00	3627.00	
RES SEAT FORCE / WT	10.97	0.35	3899.00	3627.00	
LF FOOT X	2.60	-194.50	3848.00	3898.00	20
RT FOOT X	-11.01	-176.67	3848.00	3899.00	23
CT FOOT X	-7.78	-261.80	3848.00	3900.00	26
TOTAL FOOT X	-16.19	-625.84	3848.00	3898.00	
LF FOOT Y	165.64	-21.28	3883.00	3990.00	21
RT FOOT Y	27.63	-152.51	3799.00	3892.00	24
CT FOOT Y	19.60	-50.71	3941.00	3901.00	27
TOTAL FOOT Y	51.93	-67.19	3940.00	3901.00	
LF FOOT Z	219.32	-14.12	3884.00	3969.00	22
RT FOOT Z	274.24	12.89	3905.00	4137.00	25
CT FOOT Z	203.80	-93.82	3903.00	3839.00	28
TOTAL FOOT Z	621.44	-6.99	3904.00	3839.00	
RES FOOT FORCE	821.45	78.52	3907.00	4120.00	

HEAD REST POS STUDY TEST: 433 SUBJ: F-3 WT: 164.0 G: 10 GP: 1 CELL: F

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.04	9.98	14.00	2405.00	48
CARRIAGE X	1.98	-0.74	3914.00	3886.00	36
CARRIAGE Y	0.65	-0.62	3915.00	4020.00	31
CARRIAGE Z	12.09	-0.23	3907.00	3824.00	1
CARRIAGE Z (SM)	10.41	-0.10	3908.00	3600.00	
CARRIAGE VEL	-0.92	-25.73	4181.00	3865.00	29
SEAT X	1.20	-1.14	3872.00	3883.00	32
SEAT Y	0.82	-0.89	4020.00	4026.00	33
SEAT Z	11.51	-0.20	3914.00	3737.00	34
SEAT Z (SM)	10.57	-0.14	3915.00	3737.00	
CHEST X	5.08	-2.11	3931.00	3963.00	5
CHEST Y	0.00	-2.96	3998.00	3929.00	6
CHEST Z	18.11	-0.55	3942.00	3738.00	7
CHEST RES	18.17	0.62	3942.00	3884.00	
CHEST SI	49.84		3871.00	4004.00	
HEAD X	5.75	-0.01	3931.00	4111.00	2
HEAD Y	1.78	-2.23	4026.00	3938.00	3
HEAD Z	15.93	-1.27	3931.00	3753.00	4
HEAD RES	17.07	0.94	3931.00	4141.00	
HEAD SI	28.28		3895.00	3991.00	
HEAD HIC	29.57		3912.00	3961.00	
LF SHOULDER	56.56	4.71	3950.00	4046.00	16
RT SHOULDER	93.38	12.50	3943.00	4041.00	17
TOTAL SHOULDER	143.23	19.88	3944.00	4046.00	
TOTAL SHD / WT	0.87	0.12	3944.00	4046.00	
LF LAP BELT	50.82	5.48	4016.00	3918.00	8
RT LAP BELT	53.47	9.83	4012.00	3911.00	9
TOTAL LAP	103.87	16.77	4017.00	3918.00	
TOTAL LAP / WT	0.63	0.10	4017.00	3918.00	
LF SEAT LNK X	24.99	-253.02	4173.00	3923.00	18
RT SEAT LNK X	8.82	-72.21	3978.00	3925.00	19
TOTAL SEAT X	6.62	-322.93	4185.00	3925.00	
SEAT LNK Y	45.89	-84.74	4001.00	3926.00	35
LF SEAT PAN Z	495.08	5.50	3924.00	3613.00	11
RT SEAT PAN Z	870.57	0.73	3925.00	3609.00	12
CT SEAT PAN Z	865.62	5.04	3927.00	3643.00	13
TOTAL SEAT Z	1726.04	22.92	3927.00	3609.00	
TOTAL SEAT Z / WT	10.52	0.14	3927.00	3609.00	
RES SEAT FORCE	1757.52	27.34	3927.00	3608.00	
RES SEAT FORCE / WT	10.72	0.17	3927.00	3608.00	
LF FOOT X	-38.21	-185.58	3875.00	3924.00	20
RT FOOT X	-0.46	-129.99	3875.00	3925.00	23
CT FOOT X	-80.89	-237.09	4197.00	3925.00	26
TOTAL FOOT X	-105.82	-551.76	3875.00	3925.00	
LF FOOT Y	153.47	-29.09	3909.00	3897.00	21
RT FOOT Y	23.61	-143.23	3611.00	3909.00	24
CT FOOT Y	24.99	-35.53	4050.00	3920.00	27
TOTAL FOOT Y	47.10	-59.60	4026.00	3924.00	
LF FOOT Z	219.11	25.06	3910.00	4022.00	22
RT FOOT Z	211.61	38.84	3934.00	4023.00	25
CT FOOT Z	119.59	-80.57	3916.00	3886.00	28
TOTAL FOOT Z	492.80	15.15	3910.00	3866.00	
RES FOOT FORCE	677.48	177.88	3926.00	4197.00	

HEAD REST POS STUDY TEST: 444 SUBJ: F-2 WT: 160.0 G: 10 GP: 1 CELL: F

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	20.00	756.00	48
CARRIAGE X	1.19	-1.04	3828.00	3835.00	36
CARRIAGE Y	0.65	-0.69	3829.00	3801.00	31
CARRIAGE Z	12.42	-0.17	3820.00	3697.00	1
CARRIAGE Z (SM)	10.53	-0.04	3821.00	3632.00	
CARRIAGE VEL	-1.08	-25.73	4109.00	3776.00	29
SEAT X	1.18	-1.54	3784.00	3834.00	32
SEAT Y	0.93	-1.09	3783.00	3793.00	33
SEAT Z	11.90	-0.22	3827.00	3708.00	34
SEAT Z (SM)	10.61	-0.12	3827.00	3600.00	
CHEST X	6.67	-0.64	3842.00	3878.00	5
CHEST Y	0.19	-1.77	3829.00	3848.00	6
CHEST Z	22.96	-0.60	3850.00	3678.00	7
CHEST RES	22.83	0.66	3850.00	3778.00	
CHEST SI	45.75		3785.00	3910.00	
HEAD X	1.41	-2.69	3843.00	3861.00	2
HEAD Y	1.51	-0.45	3924.00	3836.00	3
HEAD Z	15.39	-1.20	3843.00	3652.00	4
HEAD RES	15.45	0.95	3843.00	4079.00	
HEAD SI	23.74		3807.00	3893.00	
HEAD HIC	19.75		3821.00	3875.00	
LF SHOULDER	31.30	11.35	3871.00	3838.00	16
RT SHOULDER	83.05	27.55	3852.00	4065.00	17
TOTAL SHOULDER	104.22	43.90	3857.00	4093.00	
TOTAL SHD / WT	0.65	0.27	3857.00	4093.00	
LF LAP BELT	79.74	28.23	3925.00	3830.00	8
RT LAP BELT	88.10	29.21	3919.00	3830.00	9
TOTAL LAP	166.90	57.44	3925.00	3830.00	
TOTAL LAP / WT	1.04	0.36	3925.00	3830.00	
LF SEAT LNK X	12.81	-234.69	4078.00	3841.00	18
RT SEAT LNK X	7.60	-127.87	3613.00	3842.00	19
TOTAL SEAT X	-3.00	-362.56	3646.00	3842.00	
SEAT LNK T	23.98	-137.63	4048.00	3838.00	35
LF SEAT PAN Z	551.36	13.77	3844.00	3662.00	11
RT SEAT PAN Z	472.28	11.93	3843.00	3613.00	12
CT SEAT PAN Z	775.08	13.70	3841.00	3635.00	13
TOTAL SEAT Z	1795.98	47.50	3840.00	3629.00	
TOTAL SEAT Z / WT	11.22	0.30	3840.00	3629.00	
RES SEAT FORCE	1836.69	48.61	3840.00	3629.00	
RES SEAT FORCE / WT	11.48	0.30	3840.00	3629.00	
LF FOOT X	13.45	-95.04	3787.00	3835.00	20
RT FOOT X	-8.80	-140.32	3786.00	3838.00	23
CT FOOT X	-13.76	-169.38	3706.00	3835.00	26
TOTAL FOOT X	-21.66	-395.46	3787.00	3835.00	
LF FOOT Y	118.37	-37.98	3822.00	3793.00	21
RT FOOT Y	15.73	-152.00	3852.00	3830.00	24
CT FOOT Y	56.76	-12.66	3861.00	3962.00	27
TOTAL FOOT Y	55.94	-65.90	3785.00	3733.00	
LF FOOT Z	214.81	1.99	3822.00	3904.00	22
RT FOOT Z	206.80	6.42	3832.00	4016.00	25
CT FOOT Z	197.59	-80.69	3829.00	3619.00	28
TOTAL FOOT Z	526.64	13.49	3829.00	3779.00	
RES FOOT FORCE	578.86	85.27	3832.00	4063.00	

HEAD REST POS STUDY TEST: 414 SUBJ: G-3 WT: 160.0 G: 10 GP: 2 CELL: F

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	1782.00	188.00	48
CARRIAGE X	1.44	-1.06	3848.00	3810.00	36
CARRIAGE Y	1.07	-0.82	3860.00	3972.00	31
CARRIAGE Z	12.40	-0.26	3855.00	3676.00	1
CARRIAGE Z (SM)	10.47	-0.12	3856.00	3660.00	
CARRIAGE VEL	-1.11	-25.54	4162.00	3821.00	29
SEAT X	1.36	-1.27	3848.00	3835.00	32
SEAT Y	1.01	-1.61	3821.00	3827.00	33
SEAT Z	11.86	-0.20	3862.00	3771.00	34
SEAT Z (SM)	10.64	-0.08	3863.00	3770.00	
CHEST X	2.55	-3.63	3878.00	3926.00	5
CHEST Y	0.36	-4.16	3980.00	3903.00	6
CHEST Z	20.08	-2.29	3899.00	3994.00	7
CHEST RES	20.45	0.30	3901.00	3982.00	
CHEST SI	42.89		3821.00	3943.00	
HEAD X	2.11	-4.32	3883.00	3924.00	2
HEAD Y	1.24	-0.74	4018.00	3905.00	3
HEAD Z	19.28	-1.26	3878.00	3976.00	4
HEAD RES	19.43	0.80	3878.00	3968.00	
HEAD SI	27.47		3827.00	3960.00	
HEAD HIC	24.42		3854.00	3934.00	
LF SHOULDER	115.10	15.67	3904.00	3983.00	16
RT SHOULDER	97.40	2.80	3909.00	4008.00	17
TOTAL SHOULDER	210.05	19.63	3906.00	3996.00	
TOTAL SHO / WT	1.31	0.12	3906.00	3996.00	
LF LAP BELT	59.71	14.07	3937.00	3861.00	8
RT LAP BELT	89.98	32.00	3936.00	3863.00	9
TOTAL LAP	149.46	48.67	3936.00	3862.00	
TOTAL LAP / WT	0.93	0.29	3936.00	3862.00	
LF SEAT LNK X	13.84	-170.35	4167.00	3875.00	18
RT SEAT LNK X	5.96	-108.47	3714.00	3877.00	19
TOTAL SEAT X	-2.34	-275.11	4143.00	3875.00	
SEAT LNK Y	41.16	-84.74	3969.00	3880.00	35
LF SEAT PAN Z	561.05	22.80	3878.00	3623.00	11
RT SEAT PAN Z	539.46	16.83	3879.00	3619.00	12
CT SEAT PAN Z	644.29	21.41	3878.00	3615.00	13
TOTAL SEAT Z	1742.60	73.19	3879.00	3609.00	
TOTAL SEAT Z / WT	10.89	0.46	3879.00	3609.00	
RES SEAT FORCE	1764.46	73.68	3879.00	3609.00	
RES SEAT FORCE / WT	11.03	0.46	3879.00	3609.00	
LF FOOT X	13.78	-132.69	3824.00	3881.00	20
RT FOOT X	26.52	-84.50	3822.00	3873.00	23
CT FOOT X	44.88	-153.68	3823.00	3875.00	28
TOTAL FOOT X	67.19	-364.64	3823.00	3881.00	
LF FOOT Y	121.57	-17.31	3858.00	3835.00	21
RT FOOT Y	37.17	-111.92	3911.00	3874.00	24
CT FOOT Y	11.18	-54.68	3669.00	3859.00	27
TOTAL FOOT Y	97.92	-97.58	3820.00	3852.00	
LF FOOT Z	172.83	-33.74	3881.00	3833.00	22
RT FOOT Z	190.67	-15.07	3883.00	3816.00	25
CT FOOT Z	136.66	-80.42	3862.00	3816.00	28
TOTAL FOOT Z	438.88	-114.80	3881.00	3816.00	
RES FOOT FORCE	570.81	22.04	3881.00	3817.00	

HEAD REST POS STUDY TEST: 443 SUBJ: G-2 WT: 118.0 G: 10 GP: 2 CELL: F

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	59.00	609.00	48
CARRIAGE X	1.33	-1.30	3863.00	3856.00	36
CARRIAGE Y	0.89	-0.88	3863.00	3811.00	31
CARRIAGE Z	19.06	-0.54	3856.00	3777.00	1
CARRIAGE Z (SM)	10.79	-0.17	3857.00	3778.00	
CARRIAGE VEL	-1.07	-25.88	4152.00	3818.00	29
SEAT X	1.65	-1.68	3821.00	3856.00	32
SEAT Y	0.97	-0.89	3820.00	3925.00	33
SEAT Z	11.62	-0.24	3864.00	3674.00	34
SEAT Z (SM)	10.61	-0.14	3864.00	3672.00	
CHEST X	5.79	-1.00	3881.00	3916.00	5
CHEST Y	0.05	-2.10	3886.00	3904.00	6
CHEST Z	20.86	-0.86	3895.00	3791.00	7
CHEST RES	20.94	0.51	3895.00	3780.00	
CHEST SI	37.64		3823.00	3960.00	
HEAD X	1.34	-3.45	3950.00	3905.00	2
HEAD Y	0.98	-0.10	4033.00	3883.00	3
HEAD Z	15.14	-0.74	3880.00	3772.00	4
HEAD RES	15.16	0.68	3881.00	3977.00	
HEAD SI	27.72		3829.00	3940.00	
HEAD HIC	23.52		3860.00	3916.00	
LF SHOULDER	54.60	11.56	3900.00	4100.00	16
RT SHOULDER	71.28	8.07	3893.00	3960.00	17
TOTAL SHOULDER	122.27	22.20	3894.00	4100.00	
TOTAL SHD / WT	1.04	0.19	3894.00	4100.00	
LF LAP BELT	52.41	24.93	3965.00	3856.00	8
RT LAP BELT	62.44	18.85	3972.00	3868.00	9
TOTAL LAP	113.47	45.71	3965.00	3860.00	
TOTAL LAP / WT	0.96	0.39	3965.00	3860.00	
LF SEAT LNK X	13.95	-158.15	4102.00	3888.00	18
RT SEAT LNK X	20.51	-66.09	3852.00	3892.00	19
TOTAL SEAT X	2.92	-221.89	4124.00	3891.00	
SEAT LNK Y	16.85	-59.42	4092.00	3879.00	35
LF SEAT PAN Z	366.00	22.32	3881.00	3601.00	11
RT SEAT PAN Z	372.14	21.07	3882.00	3638.00	12
CT SEAT PAN Z	481.89	3.30	3881.00	3658.00	13
TOTAL SEAT Z	1218.63	61.59	3881.00	3653.00	
TOTAL SEAT Z / WT	10.39	0.52	3881.00	3653.00	
RES SEAT FORCE	1238.58	61.85	3881.00	3653.00	
RES SEAT FORCE / WT	10.50	0.52	3881.00	3653.00	
LF FOOT X	5.04	-98.93	3823.00	3874.00	20
RT FOOT X	-6.73	-129.22	3822.00	3858.00	23
CT FOOT X	-7.82	-155.40	4167.00	3874.00	26
TOTAL FOOT X	-29.09	-380.02	3823.00	3874.00	
LF FOOT Y	97.62	-38.64	3859.00	3830.00	21
RT FOOT Y	22.20	-146.41	3787.00	3857.00	24
CT FOOT Y	47.72	-11.02	3897.00	3946.00	27
TOTAL FOOT Y	55.39	-58.48	3897.00	3831.00	
LF FOOT Z	183.91	-3.28	3860.00	3947.00	22
RT FOOT Z	177.71	1.95	3859.00	3954.00	25
CT FOOT Z	148.60	-76.67	3865.00	3811.00	28
TOTAL FOOT Z	392.97	-31.26	3865.00	3947.00	
RES FOOT FORCE	523.47	45.72	3859.00	4136.00	

HEAD REST POS STUDY TEST: 413 SUBJ: K-1 WT: 175.0 G: 10 GP: 2 CELL: F

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.86	1948.00	1270.00	48
CARRIAGE X	1.47	-1.09	3812.00	3825.00	36
CARRIAGE Y	0.51	-1.19	3859.00	3798.00	31
CARRIAGE Z	12.09	-0.23	3844.00	3618.00	1
CARRIAGE Z (SM)	10.47	-0.12	3845.00	3617.00	
CARRIAGE VEL	-1.06	-25.71	4143.00	3812.00	29
SEAT X	1.29	-1.44	3815.00	3823.00	32
SEAT Y	1.33	-1.67	3812.00	3818.00	33
SEAT Z	11.98	-0.33	3851.00	3684.00	34
SEAT Z (SM)	10.52	-0.09	3852.00	3684.00	
CHEST X	5.44	-1.12	3868.00	3919.00	5
CHEST Y	-0.21	-2.98	3998.00	3884.00	6
CHEST Z	18.55	-1.40	3888.00	3955.00	7
CHEST RES	19.96	0.65	3888.00	3993.00	
CHEST SI	43.95		3811.00	3940.00	
HEAD X	1.89	-4.54	3863.00	3903.00	2
HEAD Y	1.78	-2.31	3919.00	3877.00	3
HEAD Z	13.33	-1.17	3874.00	3609.00	4
HEAD RES	19.53	1.04	3874.00	4127.00	
HEAD SI	24.48		3829.00	3931.00	
HEAD HIC	21.18		3847.00	3907.00	
LF SHOULDER	66.14	14.01	3888.00	3975.00	16
RT SHOULDER	98.92	2.82	3880.00	3969.00	17
TOTAL SHOULDER	159.74	17.99	3881.00	3978.00	
TOTAL SHD / WT	0.91	0.10	3881.00	3978.00	
LF LAP BELT	56.62	25.44	3949.00	3851.00	8
RT LAP BELT	82.07	46.60	3951.00	3854.00	9
TOTAL LAP	138.23	72.83	3950.00	3852.00	
TOTAL LAP / WT	0.79	0.42	3950.00	3852.00	
LF SEAT LNK X	7.52	-172.07	4177.00	3866.00	18
RT SEAT LNK X	5.93	-187.06	3698.00	3867.00	19
TOTAL SEAT X	-9.93	-357.27	4163.00	3866.00	
SEAT LNK Y	50.65	-88.57	3956.00	3873.00	35
LF SEAT PAN Z	635.23	28.06	3868.00	3631.00	11
RT SEAT PAN Z	833.48	26.34	3868.00	3681.00	12
CT SEAT PAN Z	717.40	13.90	3870.00	3675.00	13
TOTAL SEAT Z	2181.76	85.23	3869.00	3631.00	
TOTAL SEAT Z / WT	12.47	0.49	3869.00	3631.00	
RES SEAT FORCE	2211.84	88.17	3869.00	3631.00	
RES SEAT FORCE / WT	12.64	0.50	3869.00	3631.00	
LF FOOT X	6.27	-123.02	3757.00	3862.00	20
RT FOOT X	22.19	-75.62	3809.00	3862.00	23
CT FOOT X	40.07	-128.98	3813.00	3882.00	26
TOTAL FOOT X	57.91	-927.61	3814.00	3862.00	
LF FOOT Y	134.92	-17.94	3847.00	3822.00	21
RT FOOT Y	26.02	-119.52	3722.00	3855.00	24
CT FOOT Y	21.22	-44.64	3901.00	3858.00	27
TOTAL FOOT Y	59.14	-83.18	3833.00	3876.00	
LF FOOT Z	166.20	-39.56	3848.00	3804.00	22
RT FOOT Z	150.55	-13.91	3871.00	3900.00	25
CT FOOT Z	165.67	-47.40	3850.00	3824.00	28
TOTAL FOOT Z	448.99	-69.75	3848.00	3804.00	
RES FOOT FORCE	486.75	15.60	3848.00	4114.00	

HEAD REST POS STUDY TEST: 449 SUBJ: M-2 WT: 165.0 G: 10 GP: 1 CELL: F

DATA ID	MAX	MIN	T1	T2	CM
10V EXT PWR	10.05	9.97	77.00	65.00	
CARRIAGE X	1.96	-1.27	3856.00	3823.00	48
CARRIAGE Y	1.10	-0.78	9858.00	3832.00	36
CARRIAGE Z	11.99	-0.14	3847.00	9645.00	91
CARRIAGE Z (SM)	10.59	-0.05	3848.00	3699.00	1
CARRIAGE VEL	-1.17	-25.85	4191.00	3817.00	
SEAT X	1.95	-1.74	3857.00	3861.00	29
SEAT Y	1.51	-1.45	3814.00	3821.00	32
SEAT Z	11.82	-0.20	3854.00	3711.00	33
SEAT Z (SM)	10.57	-0.11	3855.00	3711.00	34
CHEST X	2.06	-2.70	3863.00	3906.00	
CHEST Y	-0.16	-1.74	4005.00	3891.00	5
CHEST Z	25.83	-1.01	3884.00	9643.00	6
CHEST RES	25.84	0.59	3884.00	3964.00	7
CHEST SI	47.12		3813.00	3938.00	
HEAD X	0.60	-4.82	3647.00	3908.00	
HEAD Y	1.49	-1.24	9956.00	3686.00	2
HEAD Z	12.72	-0.96	3864.00	3623.00	3
HEAD RES	12.73	0.78	3864.00	4145.00	4
HEAD SI	19.27		9827.00	3960.00	
HEAD HIC	16.30		3847.00	3912.00	
LF SHOULDER	67.93	8.29	3892.00	4084.00	
RT SHOULDER	97.88	27.49	3895.00	4078.00	16
TOTAL SHOULDER	164.93	36.52	3894.00	4083.00	17
TOTAL SHO / WT	1.00	0.22	3894.00	4083.00	
LF LAP BELT	57.23	11.97	3962.00	3850.00	
RT LAP BELT	76.74	23.50	3956.00	3856.00	8
TOTAL LAP	133.68	35.83	3956.00	3858.00	9
TOTAL LAP / WT	0.81	0.22	3956.00	3856.00	
LF SEAT LNK X	27.34	-185.63	4118.00	3870.00	
RT SEAT LNK X	2.68	-128.45	9644.00	3870.00	18
TOTAL SEAT X	11.47	-314.08	4118.00	3870.00	19
SEAT LNK Y	37.83	-100.08	3973.00	3867.00	
LF SEAT PAN Z	486.39	26.59	3869.00	3615.00	35
RT SEAT PAN Z	495.88	18.74	3873.00	3602.00	11
CT SEAT PAN Z	859.35	26.89	3867.00	3616.00	12
TOTAL SEAT Z	1832.31	85.76	3872.00	3616.00	13
TOTAL SEAT Z / WT	11.10	0.52	3872.00	3616.00	
RES SEAT FORCE	1860.88	86.66	3872.00	3602.00	
RES SEAT FORCE / WT	11.28	0.53	3872.00	3602.00	
LF FOOT X	10.58	-70.79	3816.00	3852.00	
RT FOOT X	-8.53	-149.52	3814.00	3865.00	20
CT FOOT X	0.27	-167.88	3816.00	3862.00	23
TOTAL FOOT X	-3.85	-382.02	3816.00	3862.00	26
LF FOOT Y	96.97	-37.54	3849.00	3824.00	
RT FOOT Y	19.17	-141.24	3816.00	3868.00	21
CT FOOT Y	49.18	-29.14	3972.00	3827.00	24
TOTAL FOOT Y	34.73	-72.04	3831.00	3824.00	27
LF FOOT Z	192.44	-7.36	3839.00	3823.00	
RT FOOT Z	186.57	7.24	3872.00	4192.00	22
CT FOOT Z	175.60	-57.47	3870.00	3827.00	25
TOTAL FOOT Z	477.62	-11.71	3869.00	3800.00	28
RES FOOT FORCE	584.78	81.21	3869.00	4162.00	

HEAD REST POS STUDY TEST: 447 SUBJ: M11 WT: 160.0 G: 10 GP: 1 CELL: F

DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	370.00	397.00	48
CARRIAGE X	1.57	-1.16	3904.00	3912.00	96
CARRIAGE Y	0.93	-0.61	3906.00	3880.00	91
CARRIAGE Z	12.28	-0.28	3897.00	3716.00	1
CARRIAGE Z (SM)	10.67	-0.10	3898.00	3714.00	
CARRIAGE VEL	-1.10	-25.71	4164.00	3850.00	29
SEAT X	1.25	-1.49	3891.00	3897.00	32
SEAT Y	0.69	-1.10	3959.00	3924.00	33
SEAT Z	12.32	-0.26	3905.00	3736.00	34
SEAT Z (SM)	10.83	-0.16	3905.00	3735.00	
CHEST X	3.74	-2.93	3921.00	3958.00	5
CHEST Y	-0.07	-1.89	4050.00	3946.00	6
CHEST Z	17.60	-1.53	3926.00	4007.00	7
CHEST RES	17.99	0.78	3926.00	3883.00	
CHEST SI	42.69		3871.00	3993.00	
HEAD X	1.55	-3.29	3916.00	3946.00	2
HEAD Y	1.04	-1.92	3989.00	3960.00	3
HEAD Z	18.03	-0.75	3923.00	3678.00	4
HEAD RES	16.09	0.29	3923.00	4154.00	
HEAD SI	31.31		3873.00	3972.00	
HEAD HIC	26.94		3902.00	3952.00	
LF SHOULDER	53.86	1.73	3938.00	3972.00	16
RT SHOULDER	67.05	4.58	3937.00	4025.00	17
TOTAL SHOULDER	120.77	8.34	3937.00	3999.00	
TOTAL SHD / WT	0.75	0.05	3937.00	3999.00	
LF LAP BELT	37.83	3.63	4024.00	3899.00	8
RT LAP BELT	48.59	10.31	4023.00	3907.00	9
TOTAL LAP	87.36	14.19	4023.00	3900.00	
TOTAL LAP / WT	0.55	0.09	4023.00	3900.00	
LF SEAT LNK X	6.33	-183.61	4162.00	3920.00	18
RT SEAT LNK X	4.47	-127.90	3794.00	3921.00	19
TOTAL SEAT X	1.69	-310.90	3607.00	3920.00	
SEAT LNK Y	24.88	-79.37	4012.00	3922.00	35
LF SEAT PAN Z	466.22	5.21	3920.00	3619.00	11
RT SEAT PAN Z	614.65	6.62	3922.00	3671.00	12
CT SEAT PAN Z	710.25	7.44	3923.00	3620.00	13
TOTAL SEAT Z	1788.23	34.53	3922.00	3619.00	
TOTAL SEAT Z / WT	11.18	0.22	3922.00	3619.00	
RES SEAT FORCE	1815.75	35.01	3922.00	3619.00	
RES SEAT FORCE / WT	11.35	0.22	3922.00	3619.00	
LF FOOT X	-17.21	-198.04	4140.00	3914.00	20
RT FOOT X	1.57	-142.06	3865.00	3916.00	23
CT FOOT X	-2.52	-196.61	3865.00	3913.00	26
TOTAL FOOT X	-19.98	-531.35	3865.00	3915.00	
LF FOOT Y	148.56	-24.39	3899.00	3983.00	21
RT FOOT Y	15.88	-150.95	3958.00	3908.00	24
CT FOOT Y	46.54	-34.44	3897.00	3922.00	27
TOTAL FOOT Y	64.89	-79.50	3955.00	3918.00	
LF FOOT Z	234.88	5.09	3901.00	3983.00	22
RT FOOT Z	228.10	-12.60	3925.00	3990.00	25
CT FOOT Z	147.82	-92.50	3904.00	3877.00	28
TOTAL FOOT Z	469.35	-12.66	3901.00	3990.00	
RES FOOT FORCE	881.36	52.03	3925.00	4144.00	

HEAD REST POS STUDY TEST: 445 SUBJ: M10 WT: 145.0 G: 10 GP: 2 CELL: F

DATA ID	MAX	MIN	T1	T2	CM
10V EXT PWR	10.05	9.97	685.00	214.00	
CARRIAGE X	1.51	-1.26	3863.00	3880.00	48
CARRIAGE Y	1.18	-0.69	3907.00	3857.00	36
CARRIAGE Z	12.35	-0.36	3899.00	3864.00	31
CARRIAGE Z (SM)	10.45	-0.08	3899.00	3661.00	1
CARRIAGE VEL	-1.11	-25.88	4188.00	3861.00	29
SEAT X	1.91	-1.48	3869.00	3882.00	32
SEAT Y	0.58	-1.02	3865.00	3871.00	33
SEAT Z	11.97	-0.24	3905.00	3708.00	34
SEAT Z (SM)	10.68	-0.17	3906.00	3709.00	
CHEST X	7.52	-2.81	3924.00	3953.00	5
CHEST Y	0.04	-4.06	4002.00	3928.00	6
CHEST Z	17.51	-0.83	3939.00	3770.00	7
CHEST RES	18.30	0.99	3938.00	3878.00	
CHEST SI	37.63		3867.00	3986.00	
HEAD X	1.42	-3.01	3928.00	3974.00	2
HEAD Y	1.80	-1.29	3994.00	3948.00	3
HEAD Z	17.32	-0.98	3916.00	3679.00	4
HEAD RES	17.36	0.63	3916.00	3872.00	
HEAD SI	27.61		3879.00	4002.00	
HEAD HIC	20.55		3900.00	3933.00	
LF SHOULDER	51.56	8.97	3951.00	3999.00	16
RT SHOULDER	70.52	9.97	3937.00	4049.00	17
TOTAL SHOULDER	109.52	19.82	3947.00	4061.00	
TOTAL SHD / WT	0.76	0.14	3947.00	4061.00	
LF LAP BELT	50.24	12.35	3958.00	3899.00	8
RT LAP BELT	58.83	15.07	3962.00	3899.00	9
TOTAL LAP	108.59	27.43	3964.00	3899.00	
TOTAL LAP / WT	0.75	0.19	3964.00	3899.00	
LF SEAT LNK X	15.98	-205.63	4169.00	3914.00	18
RT SEAT LNK X	18.85	-73.31	3870.00	3914.00	19
TOTAL SEAT X	2.86	-278.94	3631.00	3914.00	
SEAT LNK Y	33.47	-71.85	3989.00	3920.00	35
LF SEAT PAN Z	402.37	6.92	3922.00	3728.00	11
RT SEAT PAN Z	382.08	0.59	3915.00	3761.00	12
CT SEAT PAN Z	828.62	14.33	3922.00	3709.00	13
TOTAL SEAT Z	1598.19	39.87	3921.00	3628.00	
TOTAL SEAT Z / WT	11.02	0.27	3921.00	3628.00	
RES SEAT FORCE	1622.46	40.09	3921.00	3628.00	
RES SEAT FORCE / WT	11.19	0.28	3921.00	3628.00	
LF FOOT X	8.48	-160.59	3867.00	3911.00	20
RT FOOT X	27.81	-82.34	3867.00	3912.00	23
CT FOOT X	109.22	-181.21	3868.00	3912.00	26
TOTAL FOOT X	136.82	-420.60	3867.00	3911.00	
LF FOOT Y	141.78	-14.57	3901.00	3803.00	21
RT FOOT Y	21.90	-112.10	3600.00	3910.00	24
CT FOOT Y	17.62	-60.69	3871.00	3906.00	27
TOTAL FOOT Y	48.57	-30.39	3868.00	3894.00	
LF FOOT Z	163.18	-48.34	3901.00	3860.00	22
RT FOOT Z	182.88	-31.25	3911.00	3877.00	25
CT FOOT Z	196.79	-97.72	3867.00	3860.00	28
TOTAL FOOT Z	425.91	-156.92	3925.00	3860.00	
RES FOOT FORCE	585.98	24.96	3925.00	3999.00	

HEAD REST POS STUDY TEST: 448 SUBJ: M13 WT: 170.0 G: 10 GP: 1 CELL: F

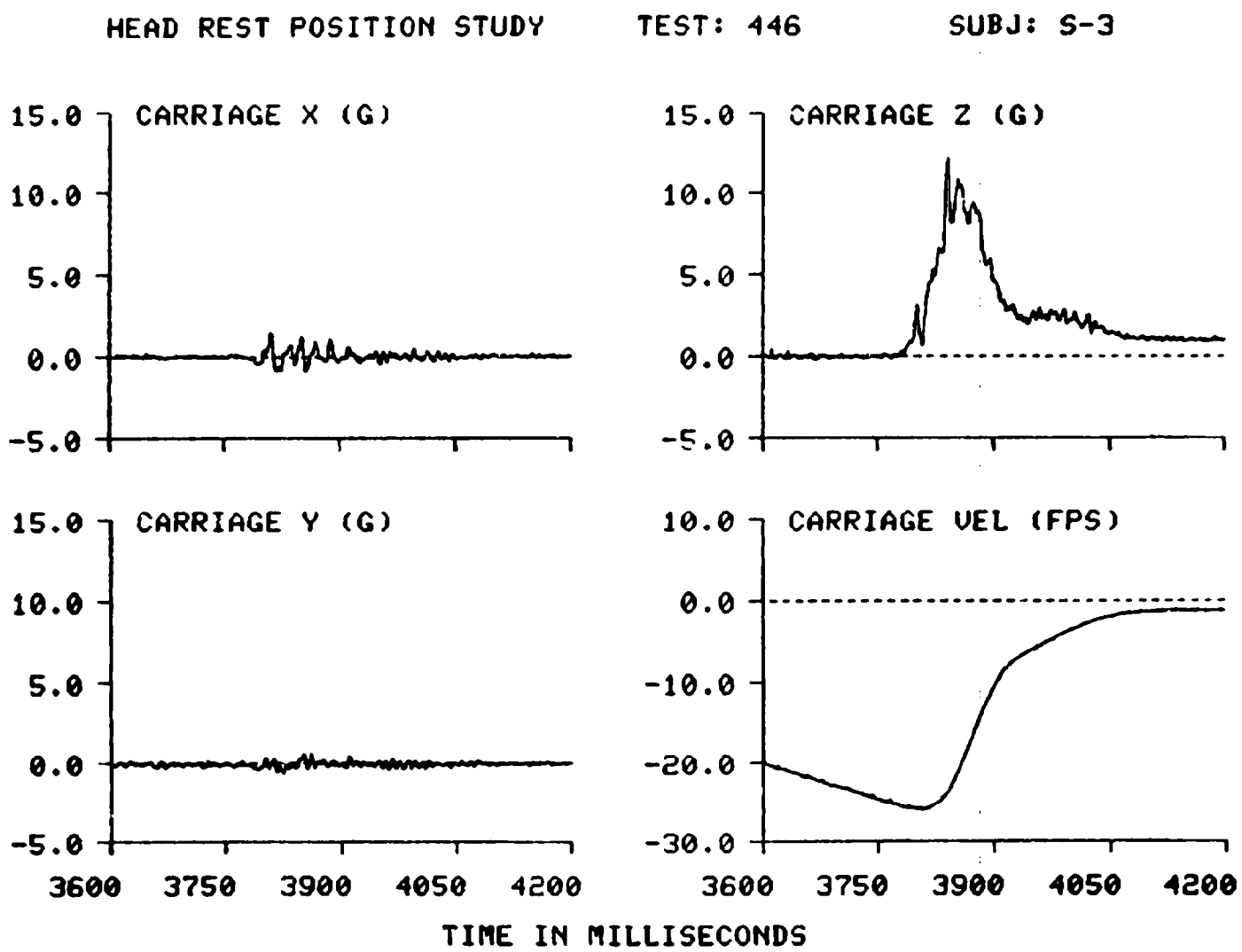
DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.96	234.00	190.00	48
CARRIAGE X	1.41	-1.01	3879.00	3874.00	36
CARRIAGE Y	0.88	-0.80	3880.00	3996.00	31
CARRIAGE Z	12.48	-0.27	3873.00	3702.00	1
CARRIAGE Z (SM)	10.46	-0.12	3874.00	3702.00	
CARRIAGE VEL	-1.10	-25.74	4171.00	3821.00	29
SEAT X	1.28	-1.46	3842.00	3873.00	32
SEAT Y	1.21	-1.61	3839.00	3848.00	33
SEAT Z	12.09	-0.25	3880.00	3708.00	34
SEAT Z (SM)	10.77	-0.11	3881.00	3709.00	
CHEST X	4.24	-1.81	3895.00	3931.00	5
CHEST Y	0.08	-2.79	3972.00	3895.00	6
CHEST Z	19.08	-0.79	3900.00	3713.00	7
CHEST RES	19.49	0.53	3900.00	3976.00	
CHEST SI	41.00		3841.00	3971.00	
HEAD X	5.11	-0.61	3891.00	3930.00	2
HEAD Y	2.34	0.08	3959.00	3906.00	3
HEAD Z	18.37	-1.42	3892.00	3713.00	4
HEAD RES	17.18	1.36	3892.00	4198.00	
HEAD SI	26.83		3857.00	3966.00	
HEAD HIC	21.24		3877.00	3916.00	
LF SHOULDER	56.50	1.38	3914.00	3998.00	16
RT SHOULDER	84.99	1.47	3911.00	4013.00	17
TOTAL SHOULDER	120.66	4.87	3912.00	4009.00	
TOTAL SHO / WT	0.71	0.03	3912.00	4009.00	
LF LAP BELT	34.87	4.01	3988.00	3885.00	8
RT LAP BELT	43.82	8.84	3985.00	3884.00	9
TOTAL LAP	77.76	13.06	3987.00	3884.00	
TOTAL LAP / WT	0.46	0.08	3987.00	3884.00	
LF SEAT LNK X	1.39	-249.57	4121.00	3888.00	18
RT SEAT LNK X	-4.71	-181.62	3796.00	3895.00	19
TOTAL SEAT X	-12.47	-430.57	4135.00	3868.00	
SEAT LNK Y	31.91	-106.10	9988.00	3897.00	35
LF SEAT PAN Z	424.23	6.79	3889.00	3612.00	11
RT SEAT PAN Z	518.44	3.70	3896.00	3625.00	12
CT SEAT PAN Z	999.94	6.55	3897.00	3603.00	13
TOTAL SEAT Z	1829.87	31.41	3897.00	3600.00	
TOTAL SEAT Z / WT	11.95	0.18	3897.00	3600.00	
RES SEAT FORCE	1977.25	50.37	3897.00	3600.00	
RES SEAT FORCE / WT	11.63	0.30	3897.00	3600.00	
LF FOOT X	8.50	-138.87	3842.00	3900.00	20
RT FOOT X	22.28	-133.67	3841.00	3900.00	23
CT FOOT X	84.50	-169.25	3842.00	3900.00	26
TOTAL FOOT X	102.96	-435.80	3842.00	3900.00	
LF FOOT Y	151.23	-24.34	3875.00	4016.00	21
RT FOOT Y	27.47	-151.79	3738.00	3883.00	24
CT FOOT Y	31.27	-94.58	4016.00	3851.00	27
TOTAL FOOT Y	59.85	-61.40	3861.00	3903.00	
LF FOOT Z	228.41	-36.11	3900.00	3833.00	22
RT FOOT Z	215.40	5.54	3892.00	3871.00	25
CT FOOT Z	198.25	-91.07	3905.00	3852.00	28
TOTAL FOOT Z	500.87	-78.30	3899.00	3833.00	
RES FOOT FORCE	646.89	51.36	3900.00	3989.00	

HEAD REST POS STUDY TEST: 430 SUBJ: R-2 WT: 143.0 G: 10 GP: 1 CELL: F

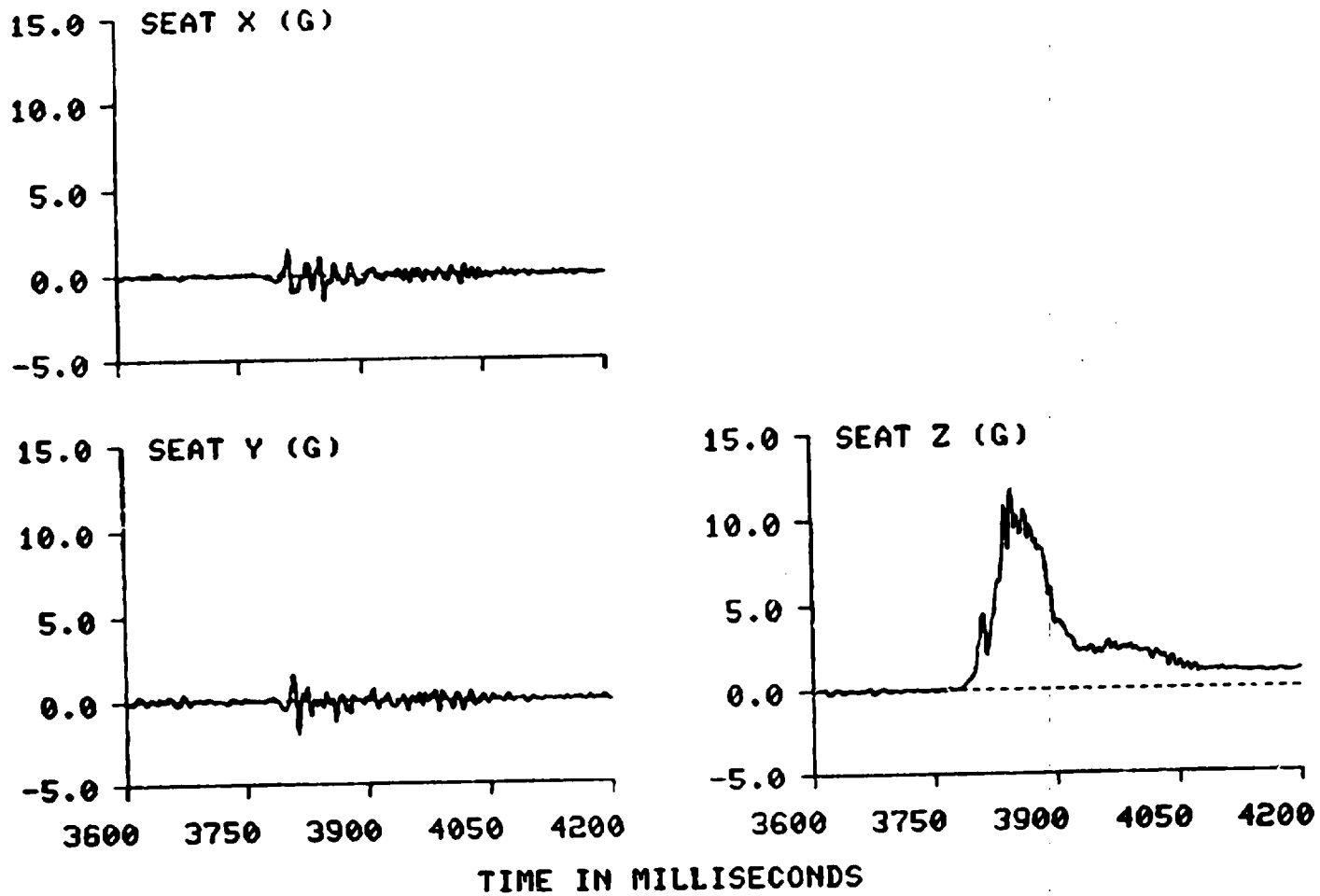
DATA ID	MAX	MIN	T1	T2	CM
10V EXT PWR	10.05	9.96	283.00	245.00	48
CARRIAGE X	1.90	-1.04	3889.00	3860.00	36
CARRIAGE Y	1.08	-0.56	3891.00	3833.00	31
CARRIAGE Z	12.12	-0.18	3881.00	3630.00	1
CARRIAGE Z (SM)	10.43	-0.09	3882.00	3661.00	
CARRIAGE VEL	-0.90	-25.77	4194.00	3843.00	29
SEAT X	1.08	-1.49	3875.00	3863.00	32
SEAT Y	1.02	-1.20	3849.00	3855.00	33
SEAT Z	11.52	-0.33	3889.00	3726.00	34
SEAT Z (SM)	10.69	-0.17	3889.00	3710.00	
CHEST X	4.82	-1.27	3905.00	3944.00	5
CHEST Y	-1.03	-3.88	3960.00	3929.00	6
CHEST Z	14.38	-1.09	3923.00	3713.00	7
CHEST RES	15.02	1.42	3924.00	3800.00	
CHEST SI	26.18		3847.00	3959.00	
HEAD X	3.08	-1.75	3965.00	3990.00	2
HEAD Y	1.03	-1.48	3988.00	3922.00	3
HEAD Z	13.95	-0.40	3902.00	3988.00	4
HEAD RES	14.21	0.18	3903.00	3776.00	
HEAD SI	28.22		3851.00	4131.00	
HEAD HIC	25.65		3879.00	3944.00	
LF SHOULDER	47.94	17.40	3933.00	4057.00	16
RT SHOULDER	46.26	3.02	3931.00	4031.00	17
TOTAL SHOULDER	93.66	21.24	3931.00	4031.00	
TOTAL SHD / WT	0.65	0.15	3931.00	4031.00	
LF LAP BELT	39.09	6.46	3963.00	3890.00	8
RT LAP BELT	59.29	16.22	3990.00	3892.00	9
TOTAL LAP	96.61	23.00	3992.00	3891.00	
TOTAL LAP / WT	0.68	0.16	3992.00	3891.00	
LF SEAT LNK X	33.17	-129.73	3991.00	3897.00	18
RT SEAT LNK X	13.88	-69.01	3953.00	3896.00	19
TOTAL SEAT X	43.55	-198.16	4146.00	3696.00	
SEAT LNK Y	49.77	-31.95	3976.00	3891.00	35
LF SEAT PAN Z	275.96	3.55	3898.00	3676.00	11
RT SEAT PAN Z	981.67	2.09	3905.00	3640.00	12
CT SEAT PAN Z	864.82	25.66	3899.00	3604.00	13
TOTAL SEAT Z	1513.15	52.61	3898.00	3604.00	
TOTAL SEAT Z / WT	10.58	0.37	3898.00	3604.00	
RES SEAT FORCE	1525.28	53.41	3898.00	3604.00	
RES SEAT FORCE / WT	10.67	0.37	3898.00	3604.00	
LF FOOT X	6.35	-164.53	3851.00	3901.00	20
RT FOOT X	25.80	-103.73	3850.00	3900.00	23
CT FOOT X	52.11	-201.01	3851.00	3900.00	26
TOTAL FOOT X	78.97	-462.04	3851.00	3900.00	
LF FOOT Y	145.82	-19.27	3884.00	4056.00	21
RT FOOT Y	19.20	-125.45	3812.00	3900.00	24
CT FOOT Y	20.93	-60.94	4005.00	3894.00	27
TOTAL FOOT Y	53.04	-55.79	3922.00	3912.00	
LF FOOT Z	173.80	-11.39	3885.00	3839.00	22
RT FOOT Z	198.83	-3.96	3900.00	3707.00	25
CT FOOT Z	136.97	-85.72	3892.00	3862.00	28
TOTAL FOOT Z	442.15	-73.68	3892.00	3838.00	
RES FOOT FORCE	634.53	39.90	3901.00	4170.00	

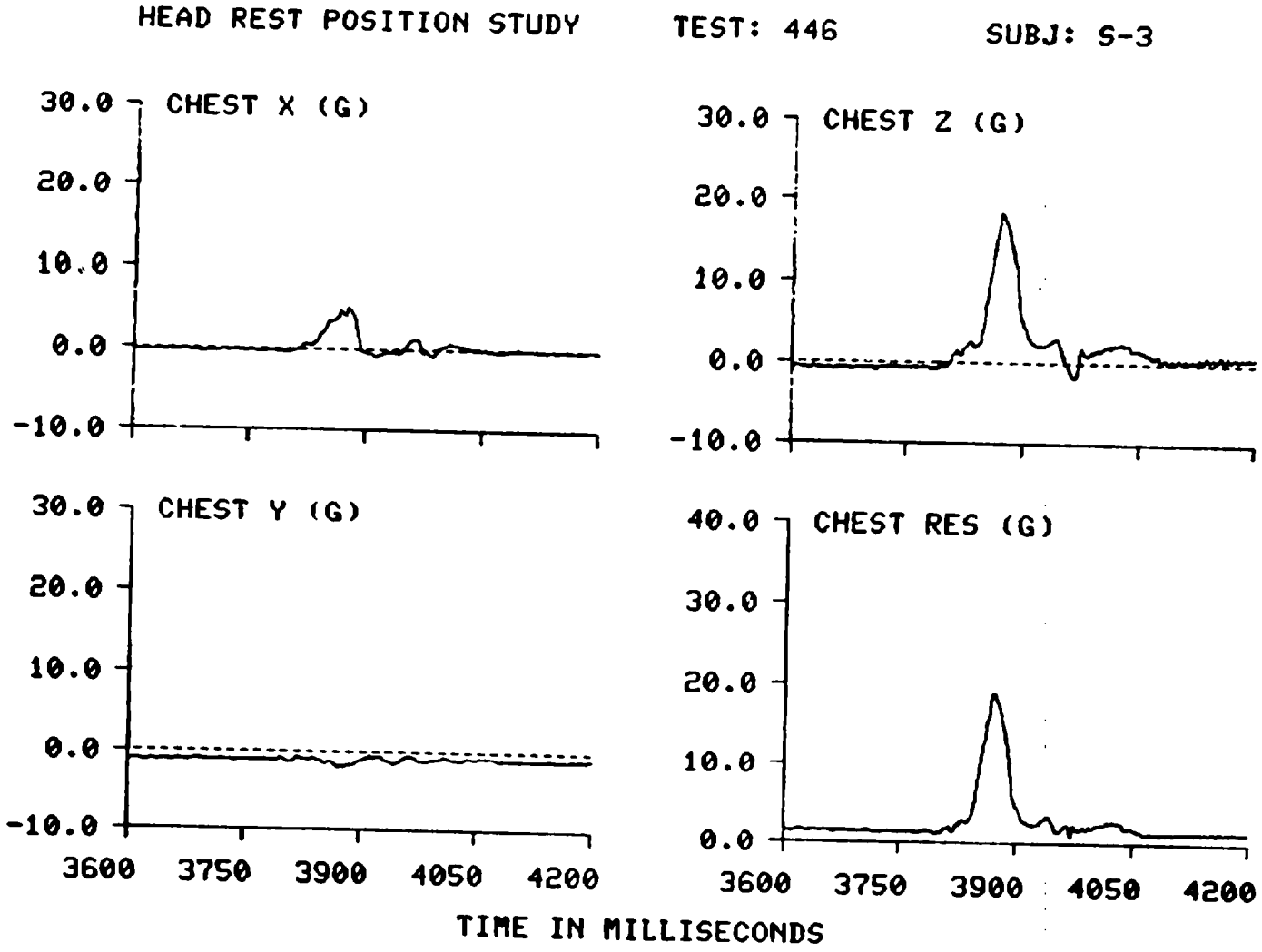
HEAD REST POS STUDY TEST: 446 SUBJ: S-3 WT: 171.0 G: 10 GP: 2 CELL: F

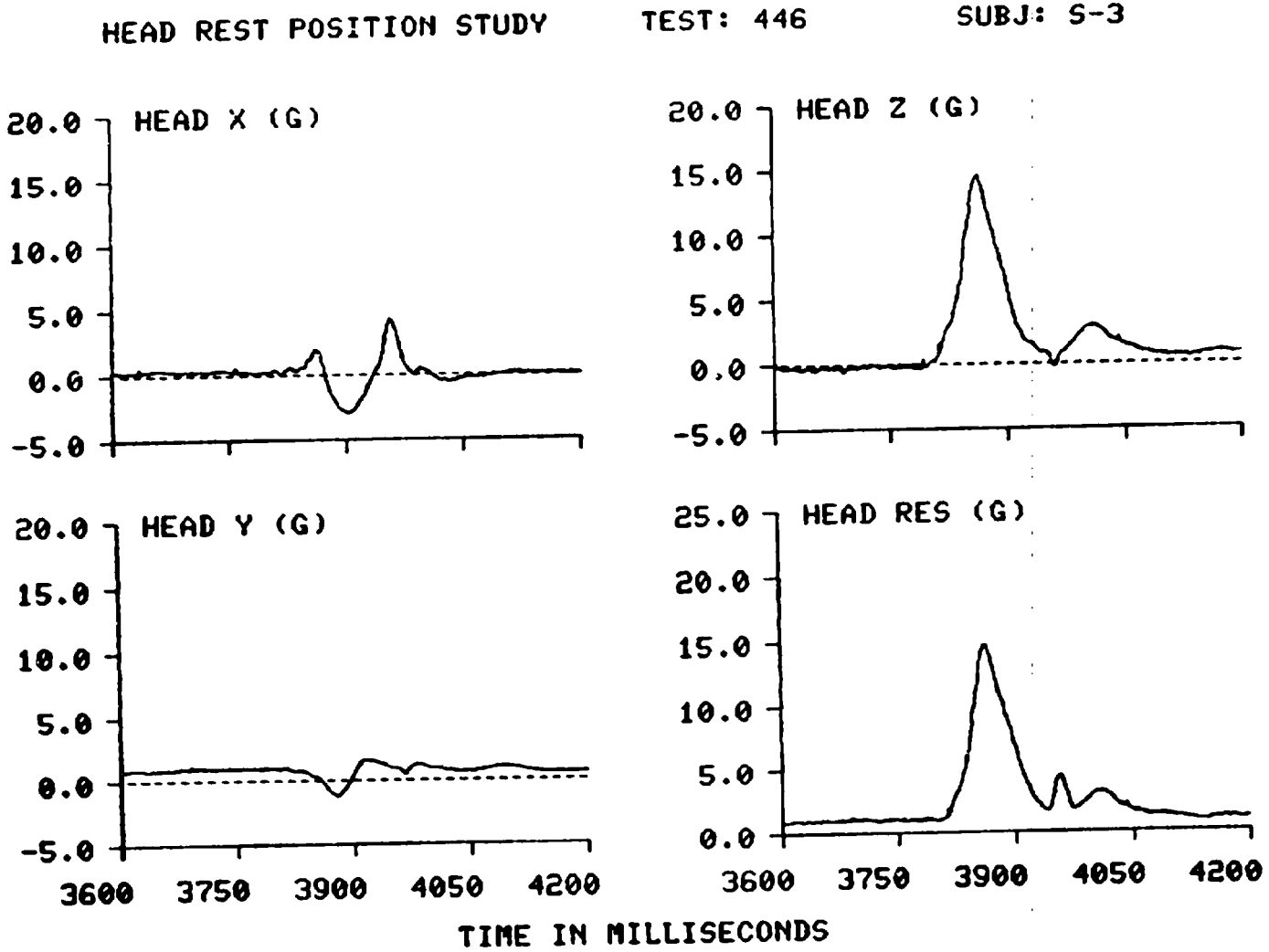
DATA ID	MAX	MIN	T1	T2	CH
10V EXT PWR	10.05	9.97	158.00	563.00	48
CARRIAGE X	1.47	-0.87	3809.00	3854.00	36
CARRIAGE Y	0.62	-0.68	3851.00	3824.00	51
CARRIAGE Z	12.22	-0.24	3841.00	3670.00	1
CARRIAGE Z (SM)	10.40	-0.10	3856.00	3670.00	
CARRIAGE VEL	-1.08	-26.01	4192.00	3805.00	29
SEAT X	1.56	-1.48	3810.00	3855.00	32
SEAT Y	1.59	-2.03	3807.00	3813.00	33
SEAT Z	11.71	-0.29	3847.00	3677.00	34
SEAT Z (SM)	10.53	-0.18	3848.00	3678.00	
CHEST X	5.06	-0.83	3876.00	3911.00	5
CHEST Y	-0.53	-2.02	3966.00	3872.00	6
CHEST Z	18.31	-1.82	3870.00	3965.00	7
CHEST RES	18.90	0.75	3870.00	3971.00	
CHEST SI	39.10		3813.00	3951.00	
HEAD X	1.96	-2.95	3860.00	3901.00	2
HEAD Y	1.61	-1.27	3915.00	3878.00	3
HEAD Z	14.55	-0.70	3863.00	3690.00	4
HEAD RES	14.66	0.76	3863.00	4146.00	
HEAD SI	29.53		3813.00	4065.00	
HEAD HIC	23.79		3840.00	3903.00	
LF SHOULDER	64.46	12.07	3871.00	3938.00	16
RT SHOULDER	75.02	6.44	3873.00	3960.00	17
TOTAL SHOULDER	139.22	20.97	3872.00	3938.00	
TOTAL SHD / WT	0.81	0.12	3872.00	3938.00	
LF LAP BELT	39.42	18.62	3954.00	3852.00	8
RT LAP BELT	47.56	20.78	3955.00	3854.00	9
TOTAL LAP	86.97	39.45	3954.00	3852.00	
TOTAL LAP / WT	0.51	0.23	3954.00	3852.00	
LF SEAT LNK X	7.51	-184.17	4109.00	3856.00	18
RT SEAT LNK X	4.96	-157.72	3603.00	3665.00	19
TOTAL SEAT X	-2.50	-341.27	3603.00	3863.00	
SEAT LNK Y	19.24	-84.87	4156.00	3877.00	35
LF SEAT PAN Z	502.05	26.46	3866.00	3644.00	11
RT SEAT PAN Z	635.94	26.74	3865.00	3609.00	12
CT SEAT PAN Z	795.27	24.49	3869.00	3648.00	13
TOTAL SEAT Z	1914.42	96.86	3866.00	3644.00	
TOTAL SEAT Z / WT	11.20	0.57	3866.00	3644.00	
RES SEAT FORCE	1945.27	97.84	3866.00	3644.00	
RES SEAT FORCE / WT	11.38	0.57	3866.00	3644.00	
LF FOOT X	7.49	-97.39	3809.00	3868.00	20
RT FOOT X	24.48	-51.30	3848.00	3854.00	23
CT FOOT X	63.93	-134.31	3810.00	3857.00	26
TOTAL FOOT X	94.61	-274.03	3810.00	3659.00	
LF FOOT Y	102.18	-27.10	3843.00	4020.00	21
RT FOOT Y	18.39	-91.65	3979.00	3861.00	24
CT FOOT Y	58.20	-37.02	3884.00	3852.00	27
TOTAL FOOT Y	78.09	-48.12	3888.00	3852.00	
LF FOOT Z	150.07	-38.81	3867.00	3973.00	22
RT FOOT Z	119.79	-35.96	3844.00	3840.00	25
CT FOOT Z	304.21	-46.08	3849.00	3818.00	28
TOTAL FOOT Z	444.41	-98.10	3845.00	3800.00	
RES FOOT FORCE	483.62	11.79	3867.00	3957.00	

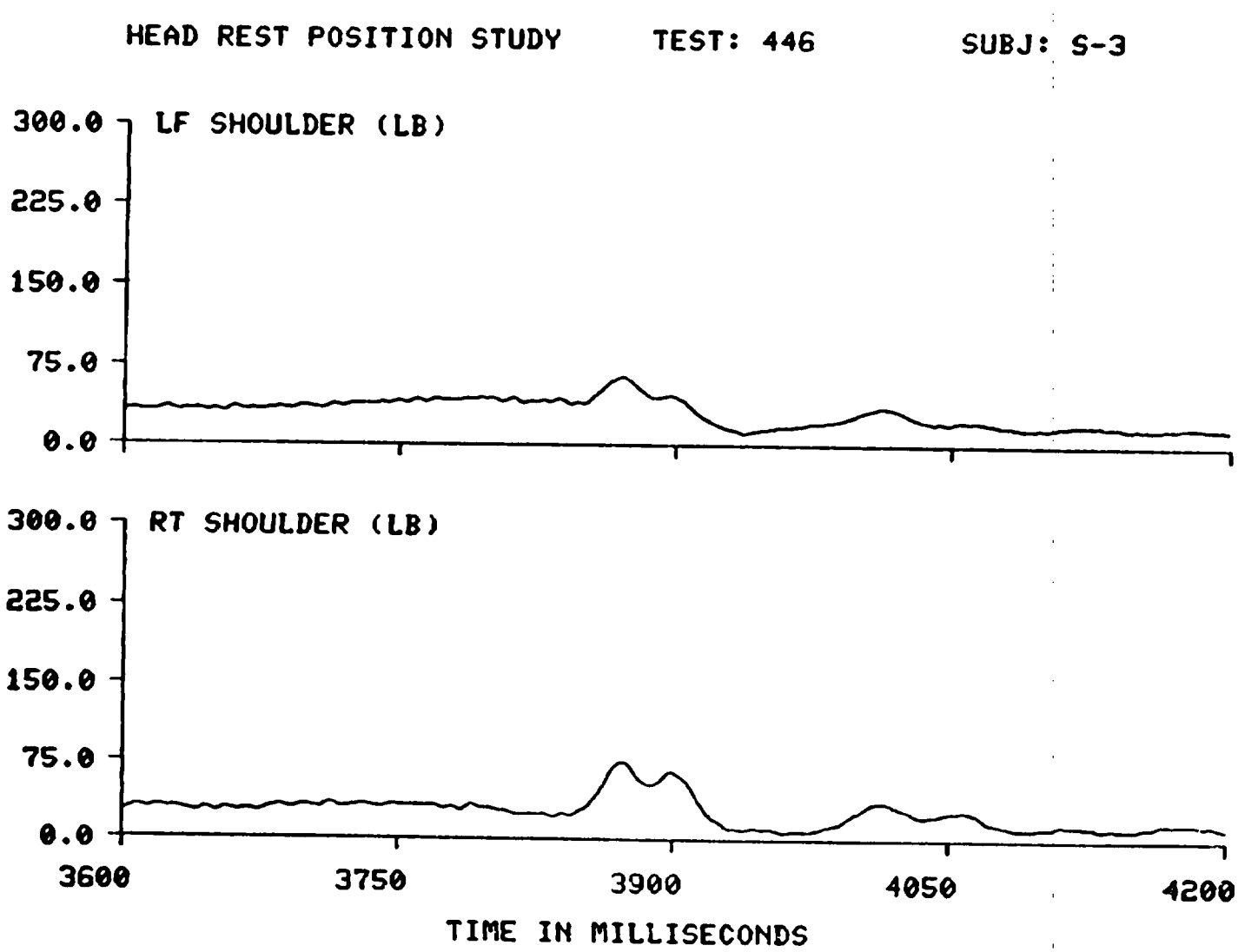

HEAD REST POSITION STUDY
TEST: 446
SUBJ: S-3
CARRIAGE X (G)
15.0
10.0
5.0
0.0
-5.0
CARRIAGE Z (G)
15.0
10.0
5.0
0.0
-5.0
CARRIAGE Y (G)
15.0
10.0
5.0
0.0
-5.0
CARRIAGE VEL (FPS)
10.0
0.0
-10.0
-20.0
-30.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

HEAD REST POSITION STUDY TEST: 446 SUBJ: S-3

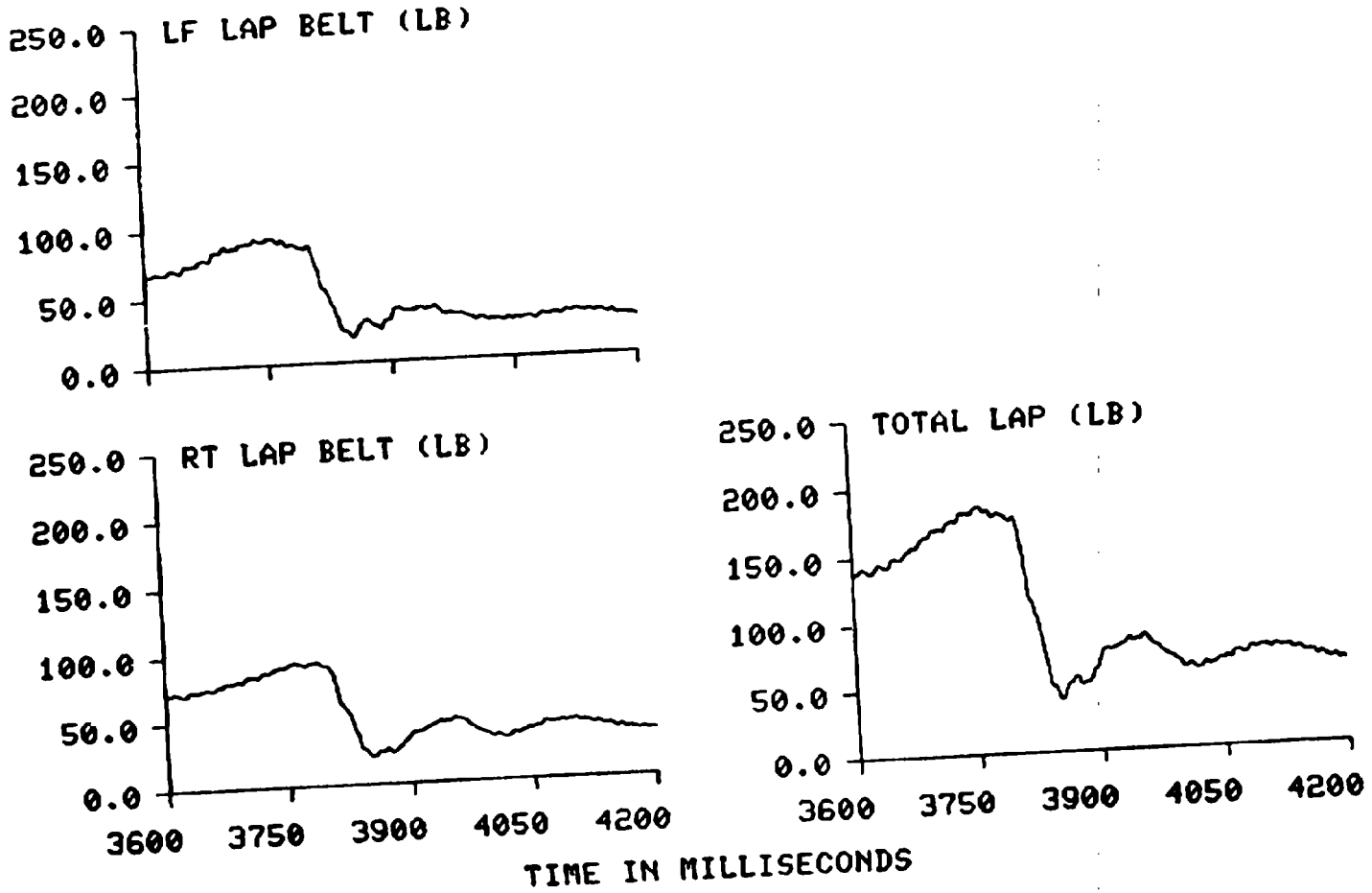


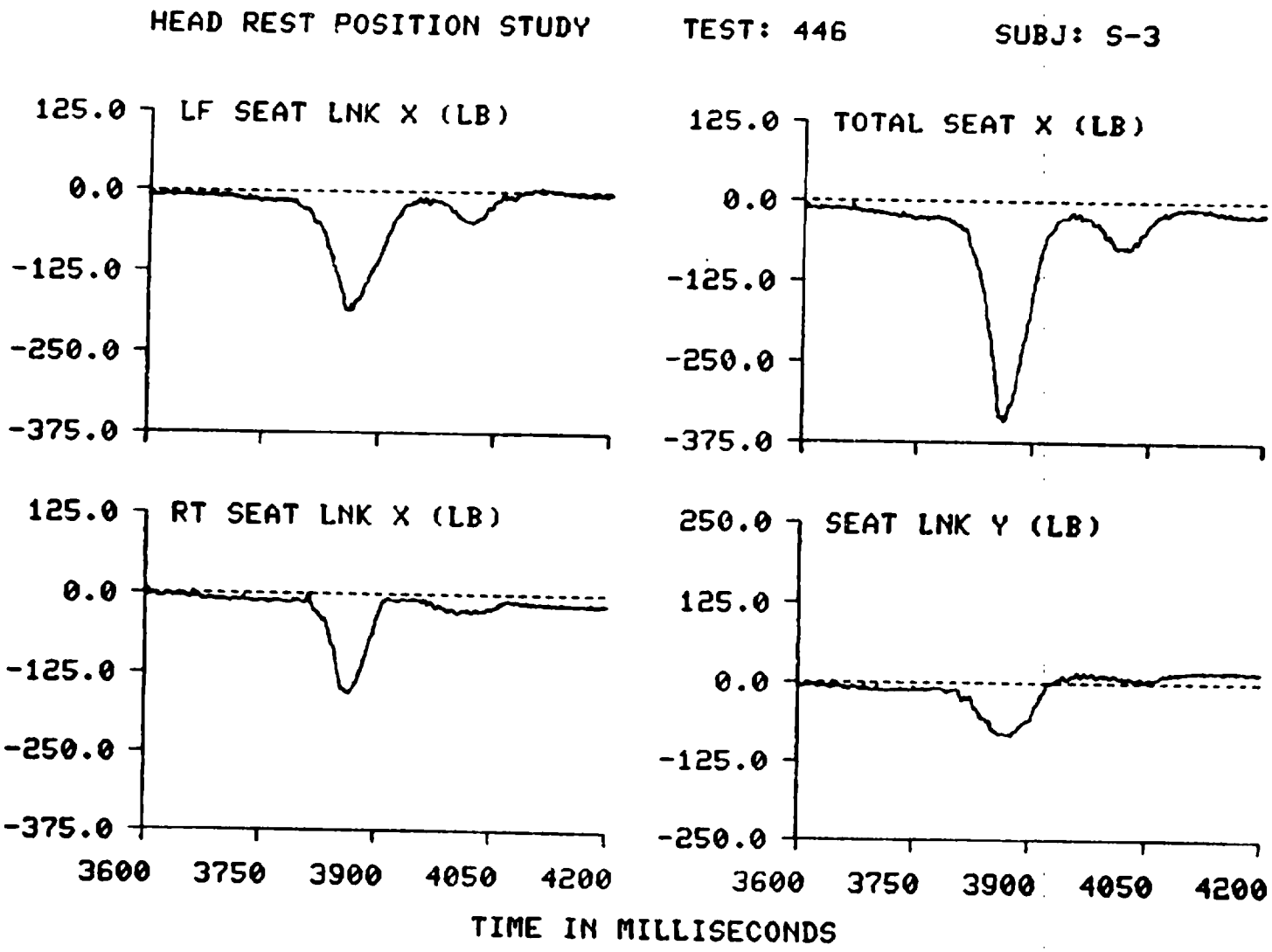

HEAD REST POSITION STUDY
TEST: 446
SUBJ: S-3
CHEST X (G)
30.0
20.0
10.0
0.0
-10.0
CHEST Z (G)
30.0
20.0
10.0
0.0
-10.0
CHEST Y (G)
30.0
20.0
10.0
0.0
-10.0
CHEST RES (G)
40.0
30.0
20.0
10.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

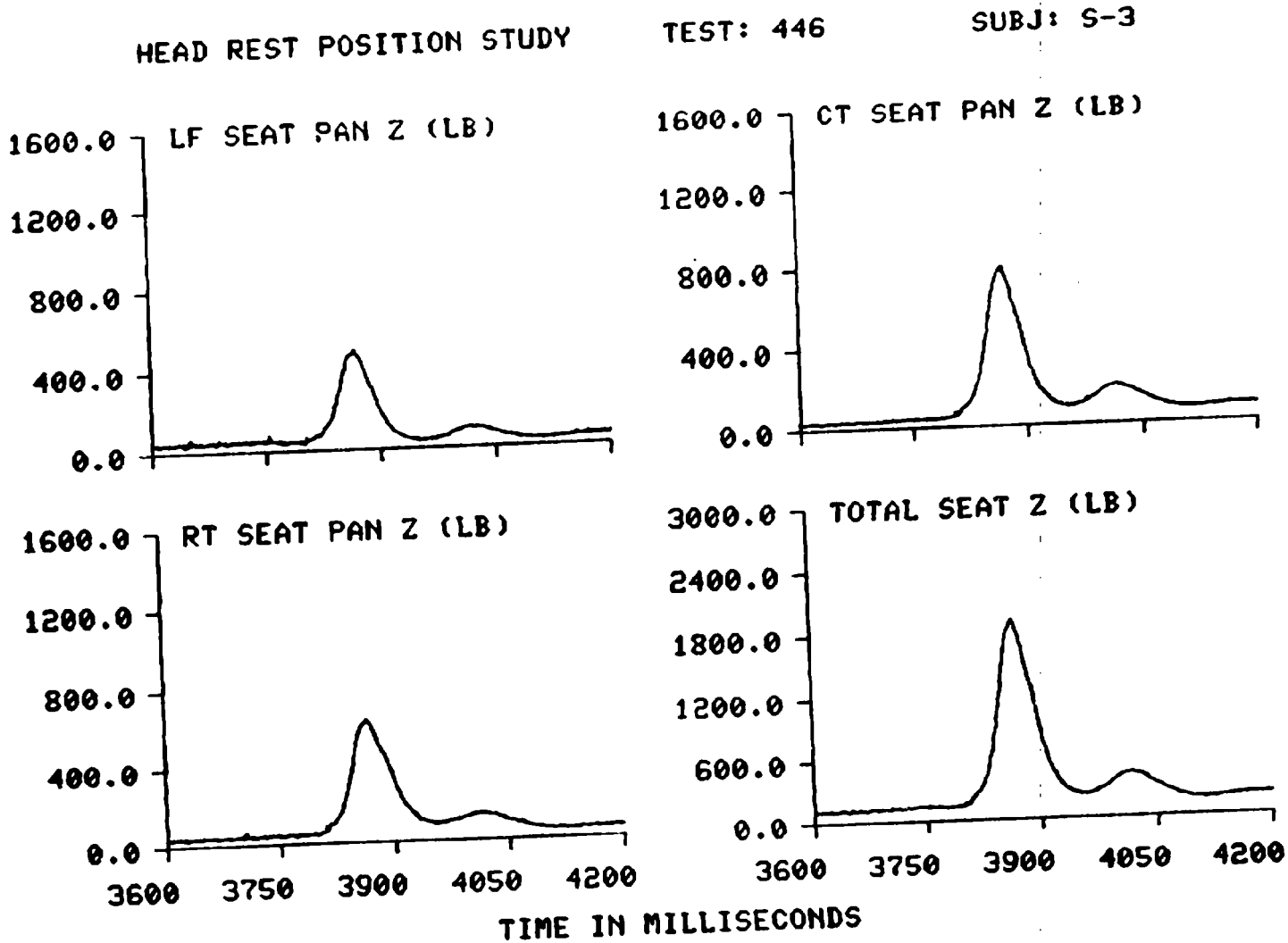

HEAD REST POSITION STUDY
TEST: 446
SUBJ: S-3
HEAD X (G)
HEAD Z (G)
HEAD Y (G)
HEAD RES (G)
20.0
15.0
10.0
5.0
0.0
-5.0
25.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

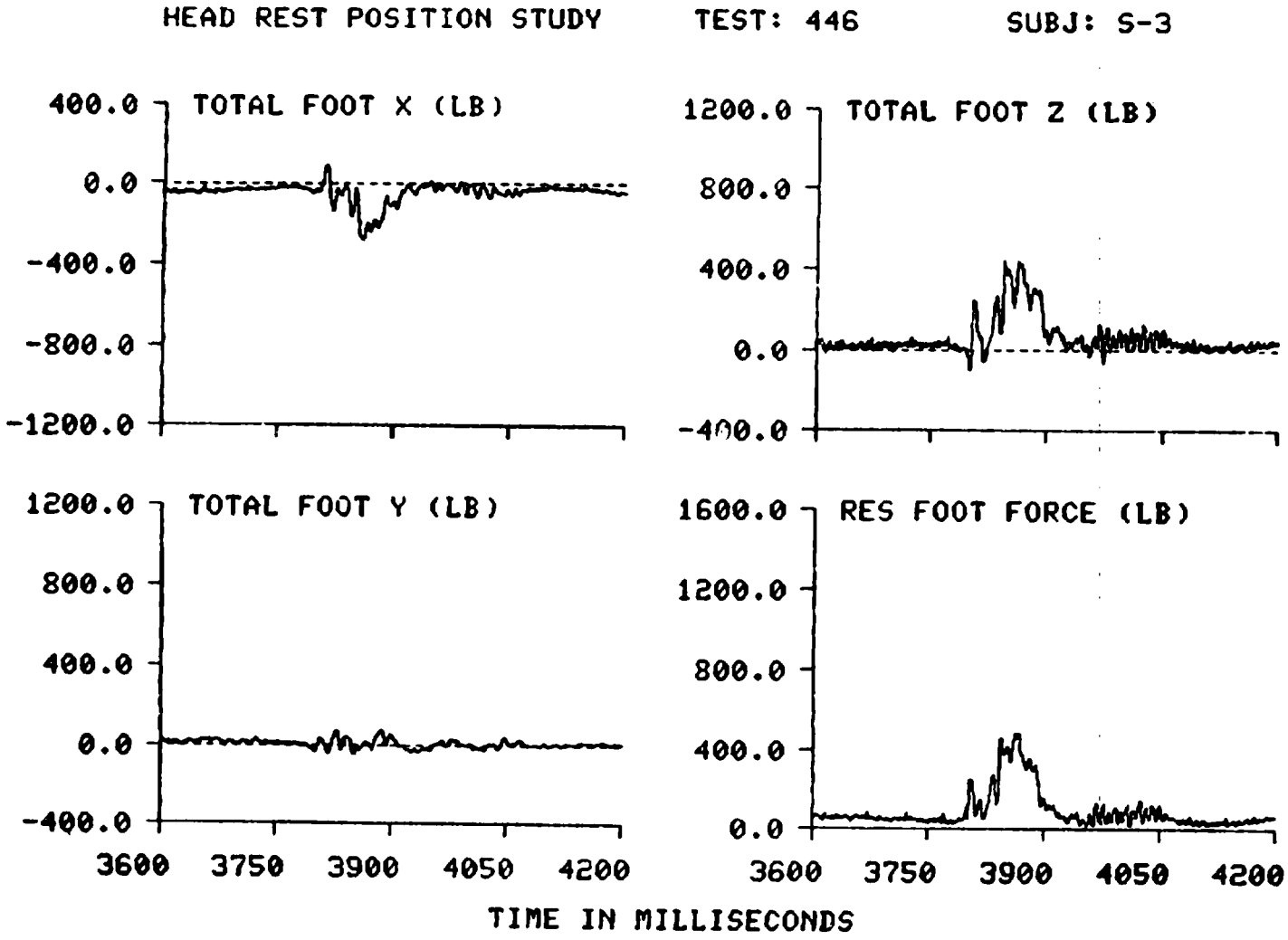

HEAD REST POSITION STUDY
TEST: 446
SUBJ: S-3
300.0
LF SHOULDER (LB)
225.0
150.0
75.0
0.0
300.0
RT SHOULDER (LB)
225.0
150.0
75.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

HEAD REST POSITION STUDY TEST: 446 SUBJ: S-3




HEAD REST POSITION STUDY
TEST: 446
SUBJ: S-3
LF SEAT LNK X (LB)
TOTAL SEAT X (LB)
RT SEAT LNK X (LB)
SEAT LNK Y (LB)
125.0
0.0
-125.0
-250.0
-375.0
250.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 446
SUBJ: S-3
LF SEAT PAN Z (LB)
CT SEAT PAN Z (LB)
RT SEAT PAN Z (LB)
TOTAL SEAT Z (LB)
1600.0
1200.0
800.0
400.0
0.0
3000.0
2400.0
1800.0
600.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS


HEAD REST POSITION STUDY
TEST: 446
SUBJ: S-3
TOTAL FOOT X (LB)
400.0
0.0
-400.0
-800.0
-1200.0
TOTAL FOOT Z (LB)
1200.0
800.0
400.0
0.0
-400.0
TOTAL FOOT Y (LB)
1200.0
800.0
400.0
0.0
-400.0
RES FOOT FORCE (LB)
1600.0
1200.0
800.0
400.0
0.0
3600
3750
3900
4050
4200
TIME IN MILLISECONDS

APPENDIX C

WILCOXON ANALYSES

The electronic data from this test program were analyzed by means of the Wilcoxon paired-replicate rank test (Wilcoxon & Wilcox, 1964). A total of seven comparisons were made by this technique. The means and estimated standard deviations of each parameter in each comparison are summarized in Tables C-1 through C-7. Since the number of comparable tests in one comparison may be different from the number of comparable tests in another comparison, minor variations in the means and standard deviations in a cell of the test matrix may be noted among these tables. An asterisk designates a statistically significant trend in a parameter at the 90% confidence level for a two-tailed test. The statistically significant trends in these comparisons are summarized in the body of the report in Tables 5, 10, and 12.

The Wilcoxon analyses of parameters for which there were statistically significant differences are also presented. In these computations, the arithmetic difference between the parameter means from each condition is first computed. These differences are then rank ordered from smallest to largest, without regard to sign. An integer from 1 to n, where n is the number of pairs in the comparison, is assigned to each difference so that the smallest difference receives the rank 1 and the largest difference receives the rank n. Then, the rank integer is given the same sign as the sign of the arithmetic difference to which it corresponds. The negative integers are summed and the positive integers are summed. Finally, if either sum is greater than or equal to the critical integer sum for the specified confidence level, then the means may be considered significantly different (i.e., from two different samples).

A complete set of Wilcoxon computations for all comparisons in this test program will be maintained by the Biomechanical Protection Branch of AFAMRL until this work unit is retired. These data will eventually be recorded in a permanent data bank within the Laboratory.

TABLE C-1

COMPARISON A-B

SUMMARY OF ELECTRONICALLY MEASURED AND COMPUTED DATA FROM WILCOXON ANALYSIS

(Peak values are tabulated for velocity, accelerations and loads.)

(n = 14)

CELL MATRIX	A		B		Significant
RESTRAINT HARNESS	MODIFIED F-111		MODIFIED F-111		at 90%
BRACING POSITION	HANDS-ON-KNEES		HANDS-ON-KNEES		Confidence
HEADREST POSITION	FORWARD		AFT		
	Mean	St Dev	Mean	St Dev	
CARRIAGE ACCELERATION (G)	10.6	0.18	10.5	0.11	
CARRIAGE VELOCITY (ft/sec)	-25.7	0.13	-25.7	0.12	
SEAT ACCELERATION (G)	10.6	0.18	10.6	0.18	
CHEST ACCELERATION (G)					
-X axis	-1.55	0.75	-1.45	0.80	
+X axis	4.29	1.66	4.21	1.46	
+Z axis	18.3	4.14	19.5	4.23	
Resultant	18.7	3.97	19.8	4.11	
CHEST SEVERITY INDEX	31.1	6.86	34.1	6.84	*
HEAD ACCELERATION (G)					
-X axis	-4.70	1.02	-2.04	1.29	*
+X axis	1.04	0.95	1.97	1.16	*
+Z axis	13.1	1.03	13.1	0.98	
Resultant	13.3	1.04	13.3	0.92	
HEAD SEVERITY INDEX	19.7	2.15	20.2	2.14	
STRAP LOADS (lb)					
Reflection Straps	95	23	94	21	
Inertia Reel Straps	95	29	81	24	*
Total Shoulder Straps	181	54	165	48	
Total Lap Belt	106	23	99	24	
Crotch Strap	96	60	112	81	
SEAT PAN LOADS (lb)					
-X axis	-263	69	-250	72	
+Z axis	1640	235	1640	207	
Resultant	1660	238	1660	210	
FOOTREST LOADS (lb)					
-X axis	-536	149	-525	163	
+Z axis	541	82	545	82	
Resultant	710	165	719	161	

TABLE C-2

COMPARISON C-D

SUMMARY OF ELECTRONICALLY MEASURED AND COMPUTED DATA FROM WILCOXON ANALYSIS

(Peak values are tabulated for velocity, accelerations and loads.)

(n = 13)

CELL MATRIX RESTRAINT HARNESS BRACING POSITION HEADREST POSITION	C MODIFIED F-111 HANDS-IN-LAP FORWARD		D MODIFIED F-111 HANDS-IN-LAP AFT		Significant at 90% Confidence
	Mean	St Dev	Mean	St Dev	
CARRIAGE ACCELERATION (G)	10.5	0.12	10.6	0.13	*
CARRIAGE VELOCITY (ft/sec)	-25.8	0.17	-25.7	0.14	
SEAT ACCELERATION (G)	10.6	0.14	10.6	0.16	
CHEST ACCELERATION (G)					
-X axis	-2.17	0.95	-2.06	0.93	
+X axis	4.32	1.23	3.82	1.25	
+Z axis	20.3	2.96	18.7	3.51	
Resultant	20.6	2.89	19.0	3.50	
CHEST SEVERITY INDEX	35.4	6.15	32.9	7.09	
HEAD ACCELERATION (G)					
-X axis	-4.90	0.95	-2.08	1.57	*
+X axis	1.14	0.92	2.44	1.02	*
+Z axis	13.3	0.92	12.7	0.88	*
Resultant	13.4	0.92	13.0	0.98	
HEAD SEVERITY INDEX	19.6	2.24	20.3	1.43	
STRAP LOADS (lb)					
Reflection Straps	103	26	107	20	
Inertia Reel Straps	110	29	101	18	
Total Shoulder Straps	205	56	203	37	
Total Lap Belt	89	25	96	16	
Crotch Strap	104	73	130	62	
SEAT PAN LOADS (lb)					
-X axis	-285	73	-265	64	*
+Z axis	1720	223	1690	206	
Resultant	1740	226	1710	209	
FOOTREST LOADS (lb)					
-X axis	-364	91	-390	88	
+Z axis	452	60	477	72	
Resultant	528	91	580	102	*

TABLE C-3

COMPARISON E-F

SUMMARY OF ELECTRONICALLY MEASURED AND COMPUTED DATA FROM WILCOXON ANALYSIS

(Peak values are tabulated for velocity, accelerations and loads.)

(n = 12)

CELL MATRIX	E		F		Significant
RESTRAINT HARNESS	CONVENTIONAL		CONVENTIONAL		at 90%
BRACING POSITION	HANDS-IN-LAP		HANDS-IN-LAP		Confidence
HEADREST POSITION	FORWARD		AFT		
	Mean	St Dev	Mean	St Dev	
CARRIAGE ACCELERATION (G)	10.5	0.16	10.5	0.11	
CARRIAGE VELOCITY (ft/sec)	-25.8	0.13	-25.7	0.17	
SEAT ACCELERATION (G)	10.6	0.14	10.7	0.10	
CHEST ACCELERATION (G)					
-X axis	-2.37	0.92	-1.86	0.97	
+X axis	3.89	1.49	4.95	1.62	*
+Z axis	20.6	3.12	19.5	2.83	
Resultant	20.8	3.10	19.9	2.71	
CHEST SEVERITY INDEX	41.9	6.48	40.8	5.47	
HEAD ACCELERATION (G)					
-X axis	-4.43	1.18	-2.63	1.66	*
+X axis	1.65	1.33	2.62	1.76	
+Z axis	14.8	1.37	14.8	1.44	
Resultant	15.0	1.42	15.1	1.55	
HEAD SEVERITY INDEX	24.5	2.81	26.7	3.12	*
STRAP LOADS (lb)					
Reflection Straps †					
Inertia Reel Straps †					
Total Shoulder Straps	144	39	137	33	
Total Lap Belt	107	24	116	27	
Crotch Strap †					
SEAT PAN LOADS (lb)					
-X axis	-324	76	-308	63	
+Z axis	1830	254	1790	282	
Resultant	1860	259	1820	284	
FOOTREST LOADS (lb)					
-X axis	-444	118	-430	100	
+Z axis	488	72	473	59	
Resultant	629	120	603	94	

† No comparison is possible, since the conventional harness does not have reflection straps or a crotch strap.

TABLE C-4

COMPARISON A-C

SUMMARY OF ELECTRONICALLY MEASURED AND COMPUTED DATA FROM WILCOXON ANALYSIS

(Peak values are tabulated for velocity, accelerations and loads.)

(n = 14)

CELL MATRIX RESTRAINT HARNESS BRACING POSITION HEADREST POSITION	A MODIFIED F-111 HANDS-ON-KNEES FORWARD		C MODIFIED F-111 HANDS-IN-LAP FORWARD		Significant at 90% Confidence
	Mean	St Dev	Mean	St Dev	
CARRIAGE ACCELERATION (G)	10.6	0.18	10.5	0.13	
CARRIAGE VELOCITY (ft/sec)	-25.7	0.13	-25.8	0.16	*
SEAT ACCELERATION (G)	10.6	0.18	10.6	0.14	
CHEST ACCELERATION (G)					
-X axis	-1.56	0.75	-2.08	0.97	*
+X axis	4.29	1.66	4.47	1.30	
+Z axis	18.3	4.14	20.0	3.02	*
Resultant	18.7	3.97	20.4	2.91	
CHEST SEVERITY INDEX	31.1	6.86	35.2	5.94	*
HEAD ACCELERATION (G)					
-X axis	-4.70	1.02	-4.83	0.95	
+X axis	1.04	0.95	1.25	0.98	
+Z axis	13.1	1.03	13.2	0.92	
Resultant	13.3	1.04	13.4	0.92	
HEAD SEVERITY INDEX	19.7	2.15	19.7	2.20	
STRAP LOADS (lb)					
Reflection Straps	95	23	104	25	
Inertia Reel Straps	95	29	112	28	*
Total Shoulder Straps	181	54	206	54	
Total Lap Belt	106	23	92	27	
Crotch Strap	96	60	106	70	
SEAT PAN LOADS (lb)					
-X axis	-263	69	-285	70	*
+Z axis	1640	235	1730	220	*
Resultant	1660	238	1760	222	*
FOOTREST LOADS (lb)					
-X axis	-536	149	-387	121	*
+Z axis	541	82	465	74	*
Resultant	710	165	551	121	*

TABLE C-5

COMPARISON B-D

SUMMARY OF ELECTRONICALLY MEASURED AND COMPUTED DATA FROM WILCOXON ANALYSIS

(Peak values are tabulated for velocity, accelerations and loads.)

(n = 13)

CELL MATRIX	B		D		Significant
RESTRAINT HARNESS	MODIFIED F-111		MODIFIED F-111		at 90%
BRACING POSITION	HANDS-ON-KNEES		HANDS-IN-LAP		Confidence
HEADREST POSITION	AFT		AFT		
	Mean	St Dev	Mean	St Dev	
CARRIAGE ACCELERATION (G)	10.6	0.09	10.6	0.13	
CARRIAGE VELOCITY (ft/sec)	-25.7	0.12	-25.7	0.14	
SEAT ACCELERATION (G)	10.7	0.10	10.6	0.16	
CHEST ACCELERATION (G)					
-X axis	-1.51	0.80	-2.06	0.93	*
+X axis	3.96	1.14	3.82	1.25	
+Z axis	19.6	4.38	18.7	3.51	
Resultant	19.9	4.28	19.0	3.50	
CHEST SEVERITY INDEX	34.1	7.12	32.9	7.09	
HEAD ACCELERATION (G)					
-X axis	-1.91	1.23	-2.08	1.57	
+X axis	1.94	1.20	2.44	1.02	
+Z axis	13.2	0.90	12.7	0.88	*
Resultant	13.5	0.83	13.0	0.98	*
HEAD SEVERITY INDEX	20.2	2.21	20.3	1.43	
STRAP LOADS (lb)					
Reflection Straps	91	19	107	20	*
Inertia Reel Straps	77	20	101	18	*
Total Shoulder Straps	158	42	203	37	*
Total Lap Belt	98	24	96	16	
Crotch Strap	101	74	130	62	
SEAT PAN LOADS (lb)					
-X axis	-247	74	-265	64	
+Z axis	1620	201	1690	206	*
Resultant	1640	204	1710	209	*
FOOTREST LOADS (lb)					
-X axis	-508	156	-390	88	*
+Z axis	538	81	477	72	*
Resultant	701	154	580	102	*

TABLE C-6

COMPARISON C-E

SUMMARY OF ELECTRONICALLY MEASURED AND COMPUTED DATA FROM WILCOXON ANALYSIS

(Peak values are tabulated for velocity, accelerations and loads.)

(n = 13)

CELL MATRIX	C		E		Significant
RESTRAINT HARNESS	MODIFIED F-111		CONVENTIONAL		at 90%
BRACING POSITION	HANDS-IN-LAP		HANDS-IN-LAP		Confidence
HEADREST POSITION	FORWARD		FORWARD		
	Mean	St Dev	Mean	St Dev	
CARRIAGE ACCELERATION (G)	10.5	0.12	10.5	0.16	
CARRIAGE VELOCITY (ft/sec)	-25.8	0.17	-25.8	0.14	
SEAT ACCELERATION (G)	10.6	0.15	10.6	0.17	
CHEST ACCELERATION (G)					
-X axis	-2.17	0.95	-2.28	0.94	
+X axis	4.32	1.23	3.93	1.43	
+Z axis	20.3	2.96	20.2	3.31	
Resultant	20.6	2.89	20.5	3.23	
CHEST SEVERITY INDEX	35.4	6.15	41.1	6.75	*
HEAD ACCELERATION (G)					
-X axis	-4.90	0.95	-4.44	1.13	*
+X axis	1.14	0.92	1.56	1.31	
+Z axis	13.3	0.92	14.7	1.32	*
Resultant	13.4	0.92	15.0	1.37	*
HEAD SEVERITY INDEX	19.6	2.24	24.3	2.75	*
STRAP LOADS (lb)					
Reflection Straps †					
Inertia Reel Straps †					
Total Shoulder Straps	205	56	146	39	*
Total Lap Belt	89	25	108	23	*
Crotch Strap †					
SEAT PAN LOADS (lb)					
-X axis	-285	73	-319	75	*
+Z axis	1720	223	1820	247	*
Resultant	1740	226	1850	253	*
FOOTREST LOADS (lb)					
-X axis	-364	91	-430	123	*
+Z axis	452	60	476	81	*
Resultant	528	91	609	136	*

† No comparison is possible, since the F/FB-111 harness has reflection straps and a crotch strap and the conventional harness does not.

TABLE C-7

COMPARISON D-F

SUMMARY OF ELECTRONICALLY MEASURED AND COMPUTED DATA FROM WILCOXON ANALYSIS

(Peak values are tabulated for velocity, accelerations and loads.)

(n = 12)

CELL MATRIX	D		F		Significant
RESTRAINT HARNESS	MODIFIED F-111		CONVENTIONAL		at 90%
BRACING POSITION	HANDS-IN-LAP		HANDS-IN-LAP		Confidence
HEADREST POSITION	AFT		AFT		
	Mean	St Dev	Mean	St Dev	
CARRIAGE ACCELERATION (G)	10.6	0.12	10.5	0.11	
CARRIAGE VELOCITY (ft/sec)	-25.7	0.15	-25.7	0.15	
SEAT ACCELERATION (G)	10.6	0.16	10.7	0.10	
CHEST ACCELERATION (G)					
-X axis	-2.04	0.96	-1.86	0.97	
+X axis	3.70	1.22	4.95	1.62	*
+Z axis	18.5	3.61	19.5	2.83	
Resultant	18.8	3.59	19.9	2.71	
CHEST SEVERITY INDEX	32.5	7.25	40.8	5.47	*
HEAD ACCELERATION (G)					
-X axis	-1.99	1.60	-2.63	1.66	
+X axis	2.40	1.05	2.62	1.76	
+Z axis	12.8	0.88	14.8	1.44	*
Resultant	13.1	1.00	15.1	1.55	*
HEAD SEVERITY INDEX	20.3	1.48	26.7	3.12	*
STRAP LOADS (lb)					
Reflection Straps †					
Inertia Reel Straps †					
Total Shoulder Straps	203	38	137	33	*
Total Lap Belt	96	17	116	28	*
Crotch Strap †					
SEAT PAN LOADS (lb)					
-X axis	-268	67	-308	63	*
+Z axis	1700	212	1790	282	*
Resultant	1720	214	1820	284	*
FOOTREST LOADS (lb)					
-X axis	-398	87	-430	100	
+Z axis	483	71	473	59	
Resultant	593	95	603	94	

† No comparison is possible, since the F/FB-111 harness has reflection straps and a crotch strap and the conventional harness does not.

DESCRIPTION OF WILCOXON ANALYSIS

A VAL is the value of the parameter in the test condition designated by FUNCTION A. B VAL is the value of the parameter in the test condition designated by FUNCTION B. A-B is the arithmetic difference between A VAL and B VAL.

The differences, A-B, are then rank ordered from smallest to largest without regard to sign. The negative differences are listed under ORD- and the positive differences are listed under ORD+.

N is the integer corresponding to the rank ordered difference, A-B, without regard to sign. N- is the integer which corresponds to a negative difference and N+ is the integer which corresponds to a positive difference.

WILCOXON ANALYSIS

ANALYSIS OF: CHEST SI

FUNCTION A = G: 10 CELL: A MAX
FUNCTION B = G: 10 CELL: B MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
D-1	28.20	27.94	0.26	0.00	0.26	1.00	0.00	1.00
G-3	32.47	34.22	-1.75	0.00	1.07	2.00	0.00	2.00
M10	33.25	27.98	5.27	-1.28	0.00	3.00	3.00	0.00
M-2	38.23	44.10	-5.87	-1.55	0.00	4.00	4.00	0.00
A-1	29.17	34.10	-4.93	-1.75	0.00	5.00	5.00	0.00
F-3	31.60	37.98	-6.38	0.00	2.46	6.00	0.00	6.00
K-1	32.67	31.60	1.07	-4.93	0.00	7.00	7.00	0.00
S-3	43.49	45.04	-1.55	0.00	5.27	8.00	0.00	8.00
M13	29.[illegible]	41.60	-11.76	-5.50	0.00	9.00	9.00	0.00
M11	30.[illegible]7	36.92	-5.95	-5.84	0.00	10.00	10.00	0.00
A-3	22.32	27.82	-5.50	-5.87	0.00	11.00	11.00	0.00
F-2	40.47	38.01	2.46	-5.95	0.00	12.00	12.00	0.00
A-2	17.12	22.76	-5.64	-6.38	0.00	13.00	13.00	0.00
G-2	26.19	27.48	-1.29	-11.76	0.00	14.00	14.00	0.00

MEAN A: 31.14 STD DEV A: 6.86 SUM OF N MINUS: 88.00
MEAN B: 34.11 STD DEV B: 6.84 SUM OF N PLUS : 17.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD X

FUNCTION A = G: 10 CELL: A MAX
FUNCTION B = G: 10 CELL: B MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
D-1	0.44	1.56	-1.12	-0.31	0.00	1.00	1.00	0.00
G-3	0.48	1.22	-0.74	0.00	0.59	2.00	0.00	2.00
M10	2.68	3.92	-1.24	-0.63	0.00	3.00	3.00	0.00
M-2	2.59	3.93	-1.34	-0.67	0.00	4.00	4.00	0.00
A-1	1.75	2.38	-0.63	-0.74	0.00	5.00	5.00	0.00
F-3	1.34	3.10	-1.76	-0.79	0.00	6.00	6.00	0.00
K-1	0.32	0.63	-0.31	-0.88	0.00	7.00	7.00	0.00
S-3	1.92	3.47	-1.55	-0.96	0.00	8.00	8.00	0.00
M13	0.08	1.04	-0.96	-1.12	0.00	9.00	9.00	0.00
M11	1.90	1.31	0.59	-1.24	0.00	10.00	10.00	0.00
A-3	0.31	1.19	-0.88	-1.34	0.00	11.00	11.00	0.00
F-2	0.11	1.67	-1.56	-1.55	0.00	12.00	12.00	0.00
A-2	0.14	0.93	-0.79	-1.56	0.00	13.00	13.00	0.00
G-2	0.54	1.21	-0.67	-1.76	0.00	14.00	14.00	0.00

MEAN A: 1.04 STD DEV A: 0.95 SUM OF N MINUS: 103.00
MEAN B: 1.97 STD DEV B: 1.16 SUM OF N PLUS : 2.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD X

FUNCTION A = G: 10 CELL: A MIN
FUNCTION B = G: 10 CELL: B MIN

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
D-1	-4.35	-1.29	-3.06	-1.51	0.00	1.00	1.00	0.00
G-3	-5.71	-3.12	-2.59	-1.75	0.00	2.00	2.00	0.00
M10	-2.58	-0.08	-2.50	-2.04	0.00	3.00	3.00	0.00
M-2	-3.90	-1.86	-2.04	-2.40	0.00	4.00	4.00	0.00
A-1	-5.36	-3.85	-1.51	-2.41	0.00	5.00	5.00	0.00
F-3	-3.29	-0.35	-2.94	-2.50	0.00	6.00	6.00	0.00
K-1	-6.52	-4.77	-1.75	-2.59	0.00	7.00	7.00	0.00
S-3	-4.47	-2.07	-2.40	-2.74	0.00	8.00	8.00	0.00
M13	-4.67	-1.37	-3.30	-2.94	0.00	9.00	9.00	0.00
M11	-4.66	-1.64	-3.02	-3.02	0.00	10.00	10.00	0.00
A-3	-5.46	-3.05	-2.41	-3.06	0.00	11.00	11.00	0.00
F-2	-4.69	-1.95	-2.74	-3.30	0.00	12.00	12.00	0.00
A-2	-5.59	-2.07	-3.52	-3.45	0.00	13.00	13.00	0.00
G-2	-4.60	-1.15	-3.45	-3.52	0.00	14.00	14.00	0.00

MEAN A: -4.70 STD DEV A: 1.02 SUM OF N MINUS: 105.00
MEAN B: -2.04 STD DEV B: 1.29 SUM OF N PLUS : 0.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SHLD REEL

FUNCTION A = G: 10 CELL: A MAX
FUNCTION B = G: 10 CELL: B MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
D-1	87.60	69.16	18.44	-4.04	0.00	1.00	1.00	0.00
G-3	103.98	98.73	5.25	-4.12	0.00	2.00	2.00	0.00
M10	56.47	60.59	-4.12	0.00	5.25	3.00	0.00	3.00
M-2	99.70	77.28	22.42	0.00	5.28	4.00	0.00	4.00
A-1	153.36	127.97	25.39	-13.60	0.00	5.00	5.00	0.00
F-3	130.98	99.32	31.66	0.00	13.99	6.00	0.00	6.00
K-1	54.44	68.04	-13.60	0.00	18.44	7.00	0.00	7.00
S-3	111.94	106.66	5.28	0.00	22.42	8.00	0.00	8.00
M13	53.54	86.10	-32.56	0.00	25.39	9.00	0.00	9.00
M11	110.66	96.67	13.99	0.00	31.66	10.00	0.00	10.00
A-3	89.03	37.31	51.72	-32.56	0.00	11.00	11.00	0.00
F-2	73.93	77.97	-4.04	0.00	32.95	12.00	0.00	12.00
A-2	106.49	62.66	43.83	0.00	43.83	13.00	0.00	13.00
G-2	93.86	60.91	32.95	0.00	51.72	14.00	0.00	14.00

MEAN A: 94.71 STD DEV A: 28.89 SUM OF N MINUS: 19.00
MEAN B: 80.67 STD DEV B: 23.50 SUM OF N PLUS : 86.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CARRIAGE Z (SM)

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: D MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
S-3	10.37	10.60	-0.23	0.00	0.02	1.00	0.00	1.00
G-3	10.39	10.47	-0.08	-0.04	0.00	2.50	2.50	0.00
A-3	10.41	10.81	-0.40	-0.04	0.00	2.50	2.50	0.00
D-1	10.51	10.61	-0.10	-0.07	0.00	4.00	4.00	0.00
G-2	10.66	10.70	-0.04	-0.08	0.00	5.00	5.00	0.00
F-3	10.45	10.80	-0.35	-0.10	0.00	6.00	6.00	0.00
M11	10.39	10.50	-0.11	-0.11	0.00	7.00	7.00	0.00
F-2	10.52	10.69	-0.17	-0.13	0.00	8.00	8.00	0.00
M10	10.56	10.69	-0.13	-0.17	0.00	9.00	9.00	0.00
M13	10.43	10.47	-0.04	-0.23	0.00	10.00	10.00	0.00
M-2	10.43	10.50	-0.07	0.00	0.27	11.00	0.00	11.00
K-1	10.69	10.67	0.02	-0.35	0.00	12.00	12.00	0.00
A-2	10.71	10.44	0.27	-0.40	0.00	13.00	13.00	0.00

MEAN A: 10.50 STD DEV A: 0.12 SUM OF N MINUS: 79.00
MEAN B: 10.61 STD DEV B: 0.13 SUM OF N PLUS : 12.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD X

FUNCTION A = G: 10 CELL: C MIN
FUNCTION B = G: 10 CELL: D MIN

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
S-3	-4.02	-0.47	-3.55	-0.89	0.00	1.00	1.00	0.00
G-3	-6.27	-3.24	-3.03	-1.70	0.00	2.00	2.00	0.00
A-3	-5.39	-3.17	-2.22	-1.84	0.00	3.00	3.00	0.00
D-1	-4.62	-1.19	-3.43	-1.97	0.00	4.00	4.00	0.00
G-2	-5.75	-1.97	-3.78	-2.22	0.00	5.00	5.00	0.00
F-3	-3.95	-0.27	-3.68	-2.30	0.00	6.00	6.00	0.00
M11	-3.93	-0.83	-3.10	-3.03	0.00	7.00	7.00	0.00
F-2	-4.47	-2.77	-1.70	-3.10	0.00	8.00	8.00	0.00
M10	-3.43	-1.13	-2.30	-3.43	0.00	9.00	9.00	0.00
M13	-5.38	-0.18	-5.20	-3.55	0.00	10.00	10.00	0.00
M-2	-5.99	-4.15	-1.84	-3.68	0.00	11.00	11.00	0.00
K-1	-6.03	-5.14	-0.89	-3.78	0.00	12.00	12.00	0.00
A-2	-4.49	-2.52	-1.97	-5.20	0.00	13.00	13.00	0.00

MEAN A: -4.90 STD DEV A: 0.95 SUM OF N MINUS: 91.00 -------
MEAN B: -2.08 STD DEV B: 1.57 SUM OF N PLUS : ------- 0.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD X

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: D MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
S-3	2.17	3.29	-1.12	-0.44	0.00	1.00	1.00	0.00
G-3	0.65	2.59	-1.94	-0.54	0.00	2.00	2.00	0.00
A-3	0.70	2.87	-2.17	-0.55	0.00	3.00	3.00	0.00
D-1	0.09	1.93	-1.84	-0.64	0.00	4.00	4.00	0.00
G-2	0.54	1.08	-0.54	0.00	0.65	5.00	0.00	5.00
F-3	0.56	3.65	-3.09	-0.66	0.00	6.00	6.00	0.00
M11	2.77	3.43	-0.66	-0.86	0.00	7.00	7.00	0.00
F-2	1.95	2.50	-0.55	-1.12	0.00	8.00	8.00	0.00
M10	2.09	2.73	-0.64	-1.84	0.00	9.00	9.00	0.00
M13	0.32	3.94	-3.62	-1.94	0.00	10.00	10.00	0.00
M-2	2.16	1.51	0.65	-2.17	0.00	11.00	11.00	0.00
K-1	0.53	0.97	-0.44	-3.09	0.00	12.00	12.00	0.00
A-2	0.32	1.18	-0.86	-3.62	0.00	13.00	13.00	0.00

MEAN A: 1.14 STD DEV A: 0.92 SUM OF N MINUS: 86.00 -------
MEAN B: 2.44 STD DEV B: 1.02 SUM OF N PLUS : ------- 5.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD Z

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: D MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
S-3	13.69	13.34	0.35	0.00	0.16	1.00	0.00	1.00
G-3	13.02	11.85	1.17	0.00	0.18	2.00	0.00	2.00
R-3	13.32	11.91	1.41	-0.27	0.00	3.00	3.00	0.00
D-1	13.74	12.47	1.27	0.00	0.35	4.00	0.00	4.00
G-2	12.39	12.66	-0.27	-0.51	0.00	5.00	5.00	0.00
F-3	13.56	12.25	1.31	0.00	0.54	6.00	0.00	6.00
M11	12.89	14.40	-1.51	0.00	1.17	7.00	0.00	7.00
F-2	14.62	13.41	1.21	0.00	1.21	8.00	0.00	8.00
M10	14.37	14.19	0.18	0.00	1.27	9.00	0.00	9.00
M13	13.15	12.99	0.16	0.00	1.31	10.00	0.00	10.00
M-2	11.31	11.82	-0.51	0.00	1.41	11.00	0.00	11.00
K-1	12.31	11.77	0.54	-1.51	0.00	12.00	12.00	0.00
R-2	14.21	12.55	1.66	0.00	1.66	13.00	0.00	13.00

MEAN A: 13.28 STD DEV A: 0.92 SUM OF N MINUS: 20.00
MEAN B: 12.74 STD DEV B: 0.88 SUM OF N PLUS : 71.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SEAT X

FUNCTION A = G: 10 CELL: C MIN
FUNCTION B = G: 10 CELL: D MIN

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
S-3	-311.47	-312.67	1.20	0.00	1.20	1.00	0.00	1.00
G-3	-279.54	-229.75	-49.79	-5.33	0.00	2.00	2.00	0.00
R-3	-213.48	-234.37	20.89	-5.85	0.00	3.00	3.00	0.00
D-1	-265.36	-234.66	-30.70	0.00	13.85	4.00	0.00	4.00
G-2	-163.13	-157.80	-5.33	0.00	20.89	5.00	0.00	5.00
F-3	-300.22	-238.38	-61.84	0.00	24.43	6.00	0.00	6.00
M11	-330.65	-305.53	-25.12	-25.12	0.00	7.00	7.00	0.00
F-2	-395.60	-332.76	-62.84	-30.70	0.00	8.00	8.00	0.00
M10	-266.53	-260.68	-5.85	-32.02	0.00	9.00	9.00	0.00
M13	-344.28	-368.71	24.43	-34.37	0.00	10.00	10.00	0.00
M-2	-267.07	-235.05	-32.02	-49.79	0.00	11.00	11.00	0.00
K-1	-389.61	-355.24	-34.37	-61.84	0.00	12.00	12.00	0.00
R-2	-171.85	-185.70	13.85	-62.84	0.00	13.00	13.00	0.00

MEAN A: -284.52 STD DEV A: 72.77 SUM OF N MINUS: 75.00
MEAN B: -265.48 STD DEV B: 64.49 SUM OF N PLUS : 16.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: AES FOOT FORCE

FUNCTION A = G: 10 CELL: C
FUNCTION B = G: 10 CELL: D

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	ABS N -	ABS N +
S-3	482.06	554.77	-72.71	0.00	1.59	1.00	0.00	1.00
G-3	464.89	528.17	-63.28	0.00	8.59	2.00	0.00	2.00
A-3	481.05	425.05	56.00	0.00	21.79	3.00	0.00	3.00
D-1	765.67	764.08	1.59	-25.43	0.00	4.00	4.00	0.00
G-2	395.06	444.92	-49.86	-25.51	0.00	5.00	5.00	0.00
F-3	515.42	713.87	-198.45	-49.86	0.00	6.00	6.00	0.00
M11	504.75	530.18	-25.43	-53.47	0.00	7.00	7.00	0.00
F-2	616.31	607.72	8.59	0.00	56.00	8.00	0.00	8.00
M10	515.64	541.15	-25.51	-63.28	0.00	9.00	9.00	0.00
M13	570.14	702.67	-132.53	-72.71	0.00	10.00	10.00	0.00
M-2	504.36	644.02	-139.66	-132.53	0.00	11.00	11.00	0.00
K-1	468.29	521.76	-53.47	-139.66	0.00	12.00	12.00	0.00
A-2	585.77	563.98	21.79	-198.45	0.00	13.00	13.00	0.00

MEAN A: 528.42 STD DEV A: 91.44
MEAN B: 580.18 STD DEV B: 102.04

SUM OF N MINUS: 77.00
SUM OF N PLUS : 14.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CHEST X

FUNCTION A = G: 10 CELL: E
FUNCTION B = G: 10 CELL: F

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	MAX N -	MAX N +
S-3	3.26	5.06	-1.80	0.00	0.17	1.00	0.00	1.00
K-1	5.61	5.44	0.17	-0.80	0.00	2.00	2.00	0.00
D-1	5.70	6.50	-0.80	-1.12	0.00	3.00	3.00	0.00
A-2	2.58	4.82	-2.24	-1.13	0.00	4.00	4.00	0.00
F-3	2.87	5.08	-2.21	0.00	1.15	5.00	0.00	5.00
G-2	4.61	5.73	-1.12	-1.41	0.00	6.00	6.00	0.00
F-2	3.21	6.67	-3.46	-1.80	0.00	7.00	7.00	0.00
M11	4.89	3.74	1.15	-2.21	0.00	8.00	8.00	0.00
M13	2.83	4.24	-1.41	-2.24	0.00	9.00	9.00	0.00
M-2	0.93	2.06	-1.13	-2.90	0.00	10.00	10.00	0.00
G-3	5.51	2.55	2.96	0.00	2.96	11.00	0.00	11.00
M10	4.62	7.52	-2.90	-3.46	0.00	12.00	12.00	0.00

MEAN A: 3.89 STD DEV A: 1.49
MEAN B: 4.95 STD DEV B: 1.62

SUM OF N MINUS: 61.00
SUM OF N PLUS : 17.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD X

FUNCTION A = G: 10 CELL: E MIN
FUNCTION B = G: 10 CELL: F MIN

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
S-3	-2.25	-2.95	0.70	0.00	0.22	1.00	0.00	1.00
K-1	-6.40	-4.54	-1.86	0.00	0.70	2.00	0.00	2.00
D-1	-4.56	-0.16	-4.40	-0.75	0.00	3.00	3.00	0.00
R-2	-4.91	-1.75	-3.16	-1.13	0.00	4.00	4.00	0.00
F-3	-3.43	-0.01	-3.42	-1.26	0.00	5.00	5.00	0.00
G-2	-4.78	-3.45	-1.33	-1.33	0.00	6.00	6.00	0.00
F-2	-4.14	-2.69	-1.45	-1.45	0.00	7.00	7.00	0.00
M11	-4.42	-3.29	-1.13	-1.86	0.00	8.00	8.00	0.00
M13	-4.37	-0.61	-3.76	-3.16	0.00	9.00	9.00	0.00
M-2	-5.57	-4.82	-0.75	-3.42	0.00	10.00	10.00	0.00
G-3	-5.58	-4.32	-1.26	-3.76	0.00	11.00	11.00	0.00
M10	-2.79	-3.01	0.22	-4.40	0.00	12.00	12.00	0.00

MEAN A: -4.43 STD DEV A: 1.18 SUM OF N MINUS: 75.00 -------
MEAN B: -2.63 STD DEV B: 1.66 SUM OF N PLUS : ------- 3.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD SI

FUNCTIC = G: 10 CELL: E ABS
FUNCTION B = G: 10 CELL: F ABS

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
S-3	25.14	29.53	-4.39	0.00	0.03	1.00	0.00	1.00
K-1	23.50	24.49	-0.99	-0.32	0.00	2.00	2.00	0.00
D-1	25.91	25.33	0.58	-0.58	0.00	3.50	3.50	0.00
R-2	23.65	28.22	-4.57	0.00	0.58	3.50	0.00	3.50
F-3	24.80	28.26	-3.46	-0.99	0.00	5.00	5.00	0.00
G-2	23.08	27.72	-4.64	-3.22	0.00	6.00	6.00	0.00
F-2	29.17	23.74	5.43	-3.46	0.00	7.00	7.00	0.00
M11	21.16	31.31	-10.15	-4.39	0.00	8.00	8.00	0.00
M13	26.51	26.83	-0.32	-4.57	0.00	9.00	9.00	0.00
M-2	18.69	19.27	-0.58	-4.64	0.00	10.00	10.00	0.00
G-3	24.25	27.47	-3.22	0.00	5.43	11.00	0.00	11.00
M10	27.64	27.61	0.03	-10.15	0.00	12.00	12.00	0.00

MEAN A: 24.46 STD DEV A: 2.81 SUM OF N MINUS: 62.50 -------
MEAN B: 26.65 STD DEV B: 3.12 SUM OF N PLUS : ------- 15.50

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CARRIAGE VEL

FUNCTION A = G: 10 CELL: A MIN
FUNCTION B = G: 10 CELL: C MIN

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
D-1	-25.61	-25.82	0.21	-0.03	0.00	1.00	1.00	0.00
M10	-25.58	-25.64	0.06	-0.05	0.00	2.00	2.00	0.00
R-1	-25.83	-25.75	-0.08	0.00	0.06	3.00	0.00	3.00
K-1	-25.54	-25.63	0.09	-0.08	0.00	4.50	4.50	0.00
F-2	-25.77	-26.04	0.27	0.00	0.08	4.50	0.00	4.50
A-2	-25.72	-25.67	-0.05	0.00	0.09	6.00	0.00	6.00
M11	-25.67	-25.64	-0.03	0.00	0.12	7.00	0.00	7.00
C-2	-25.45	-25.62	0.17	0.00	0.14	8.00	0.00	8.00
G-3	-25.73	-25.85	0.12	0.00	0.17	9.00	0.00	9.00
S-3	-25.78	-25.55	-0.23	0.00	0.21	10.00	0.00	10.00
A-3	-25.47	-25.55	0.08	-0.23	0.00	11.00	11.00	0.00
M13	-25.82	-25.96	0.14	0.00	0.24	12.00	0.00	12.00
M-2	-25.50	-25.85	0.35	0.00	0.27	13.00	0.00	13.00
F-3	-25.72	-25.96	0.24	0.00	0.35	14.00	0.00	14.00

MEAN A: -25.66 STD DEV A: 0.13 SUM OF N MINUS: 18.50
MEAN B: -25.75 STD DEV B: 0.16 SUM OF N PLUS : 86.50

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CHEST X

FUNCTION A = G: 10 CELL: A MIN
FUNCTION B = G: 10 CELL: C MIN

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
D-1	-2.61	-1.60	-1.01	-0.06	0.00	1.00	1.00	0.00
M10	-1.36	-2.17	0.81	0.00	0.07	2.00	0.00	2.00
R-1	-0.45	-0.94	0.49	0.00	0.33	3.00	0.00	3.00
K-1	-1.09	-1.03	-0.06	0.00	0.33	4.00	0.00	4.00
F-2	-1.13	-2.56	1.43	0.00	0.49	5.00	0.00	5.00
A-2	-0.46	-0.79	0.33	0.00	0.52	6.00	0.00	6.00
M11	-2.17	-3.79	1.62	0.00	0.81	7.00	0.00	7.00
C-2	-1.16	-2.13	0.97	-0.89	0.00	8.00	8.00	0.00
G-3	-1.86	-1.93	0.07	0.00	0.97	9.00	0.00	9.00
S-3	-2.29	-2.62	0.33	-1.01	0.00	10.00	10.00	0.00
A-3	-0.80	-1.98	1.18	0.00	1.18	11.00	0.00	11.00
M13	-1.49	-2.01	0.52	0.00	1.43	12.00	0.00	12.00
M-2	-2.55	-4.10	1.55	0.00	1.55	13.00	0.00	13.00
F-3	-2.35	-1.46	-0.89	0.00	1.62	14.00	0.00	14.00

MEAN A: -1.56 STD DEV A: 0.75 SUM OF N MINUS: 19.00
MEAN B: -2.08 STD DEV B: 0.97 SUM OF N PLUS : 86.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CHEST Z

FUNCTION A = G: 10 CELL: A
FUNCTION B = G: 10 CELL: C

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	MAX N -	MAX N +
D-1	13.95	16.73	-2.78	-0.23	0.00	1.00	1.00	0.00
M10	19.69	17.67	2.02	-0.65	0.00	2.00	2.00	0.00
A-1	15.30	16.50	-1.20	0.00	0.84	3.00	0.00	3.00
K-1	18.39	18.62	-0.23	-1.00	0.00	4.00	4.00	0.00
F-2	24.11	22.88	1.23	-1.20	0.00	5.00	5.00	0.00
A-2	11.41	18.25	-6.84	0.00	1.23	6.00	0.00	6.00
M11	18.12	18.77	-0.65	0.00	1.65	7.00	0.00	7.00
G-2	14.36	22.74	-8.38	-1.76	0.00	8.00	8.00	0.00
G-3	20.86	21.86	-1.00	0.00	2.02	9.00	0.00	9.00
S-3	26.23	25.39	0.84	-2.16	0.00	10.00	10.00	0.00
A-3	14.76	16.92	-2.16	-2.78	0.00	11.00	11.00	0.00
M13	19.43	25.04	-5.61	-5.61	0.00	12.00	12.00	0.00
M-2	21.73	20.08	1.65	-6.84	0.00	13.00	13.00	0.00
F-3	17.36	19.12	-1.76	-8.38	0.00	14.00	14.00	0.00

MEAN A: 18.26 STD DEV A: 4.14
MEAN B: 20.04 STD DEV B: 3.02

SUM OF N MINUS: 80.00
SUM OF N PLUS : 25.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CHEST SI

FUNCTION A = G: 10 CELL: A
FUNCTION B = G: 10 CELL: C

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	MAX N -	MAX N +
D-1	28.20	27.57	0.63	0.00	0.43	1.00	0.00	1.00
M10	33.25	31.71	1.54	0.00	0.63	2.00	0.00	2.00
A-1	29.17	33.06	-3.89	0.00	1.54	3.00	0.00	3.00
K-1	32.67	37.60	-4.93	0.00	2.37	4.00	0.00	4.00
F-2	40.47	38.10	2.37	-3.89	0.00	5.00	5.00	0.00
A-2	17.12	32.99	-15.87	0.00	4.02	6.00	0.00	6.00
M11	30.97	39.65	-8.68	0.00	4.85	7.00	0.00	7.00
G-2	26.19	35.13	-8.94	-4.93	0.00	8.00	8.00	0.00
G-3	32.47	38.79	-6.32	-5.02	0.00	9.00	9.00	0.00
S-3	43.49	43.06	0.43	-6.32	0.00	10.00	10.00	0.00
A-3	22.32	27.34	-5.02	-8.68	0.00	11.00	11.00	0.00
M13	29.84	47.31	-17.47	-8.94	0.00	12.00	12.00	0.00
M-2	38.23	33.38	4.85	-15.87	0.00	13.00	13.00	0.00
F-3	31.60	27.58	4.02	-17.47	0.00	14.00	14.00	0.00

MEAN A: 31.14 STD DEV A: 6.86
MEAN B: 35.23 STD DEV B: 5.94

SUM OF N MINUS: 82.00
SUM OF N PLUS : 23.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SHLD REEL

FUNCTION A = G: 10 CELL: A MAX
FUNCTION B = G: 10 CELL: C MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
D-1	87.60	95.09	-7.49	-2.84	0.00	1.00	1.00	0.00
M10	56.47	71.71	-15.24	-3.52	0.00	2.00	2.00	0.00
R-1	153.36	133.12	20.24	-4.61	0.00	3.00	3.00	0.00
K-1	54.44	74.81	-20.37	-7.49	0.00	4.00	4.00	0.00
F-2	73.93	141.31	-67.38	0.00	9.91	5.00	0.00	5.00
R-2	106.49	62.10	44.39	-15.24	0.00	6.00	6.00	0.00
M11	110.66	100.75	9.91	0.00	20.24	7.00	0.00	7.00
G-2	93.86	98.47	-4.61	-20.37	0.00	8.00	8.00	0.00
G-3	103.98	137.25	-33.27	-25.84	0.00	9.00	9.00	0.00
S-3	111.94	115.46	-3.52	-33.27	0.00	10.00	10.00	0.00
R-3	89.03	114.87	-25.84	0.00	44.39	11.00	0.00	11.00
M13	53.54	130.38	-76.84	-53.03	0.00	12.00	12.00	0.00
M-2	99.70	152.73	-53.03	-67.38	0.00	13.00	13.00	0.00
F-3	130.98	133.82	-2.84	-76.84	0.00	14.00	14.00	0.00

MEAN A: 94.71 STD DEV A: 28.89 SUM OF N MINUS: 82.00 -------
MEAN B: 111.56 STD DEV B: 28.45 SUM OF N PLUS : ------- 23.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SEAT X

FUNCTION A = G: 10 CELL: A MIN
FUNCTION B = G: 10 CELL: C MIN

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
D-1	-218.85	-265.36	46.51	-1.47	0.00	1.00	1.00	0.00
M10	-250.40	-266.53	16.13	-7.83	0.00	2.00	2.00	0.00
R-1	-354.98	-296.68	-58.30	-12.97	0.00	3.00	3.00	0.00
K-1	-288.88	-389.61	100.73	0.00	16.13	4.00	0.00	4.00
F-2	-339.18	-395.60	56.42	-17.76	0.00	5.00	5.00	0.00
R-2	-184.82	-171.85	-12.97	0.00	21.47	6.00	0.00	6.00
M11	-293.85	-330.65	36.80	0.00	22.44	7.00	0.00	7.00
G-2	-141.66	-163.13	21.47	0.00	32.45	8.00	0.00	8.00
G-3	-287.37	-279.54	-7.83	0.00	36.80	9.00	0.00	9.00
S-3	-329.23	-311.47	-17.76	0.00	46.51	10.00	0.00	10.00
R-3	-191.04	-213.48	22.44	0.00	56.42	11.00	0.00	11.00
M13	-345.75	-344.28	-1.47	-58.30	0.00	12.00	12.00	0.00
M-2	-184.08	-267.07	82.99	0.00	82.99	13.00	0.00	13.00
F-3	-267.77	-300.22	32.45	0.00	100.73	14.00	0.00	14.00

MEAN A: -262.70 STD DEV A: 69.11 SUM OF N MINUS: 23.00 -------
MEAN B: -285.39 STD DEV B: 69.99 SUM OF N PLUS : ------- 82.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SEAT Z

FUNCTION A = G: 10 CELL: A
FUNCTION B = G: 10 CELL: C

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	MAX N -	MAX N +
O-1	2018.27	2210.54	-192.27	-0.21	0.00	1.00	1.00	0.00
M10	1541.13	1612.33	-71.20	0.00	17.26	2.00	0.00	2.00
A-1	1918.39	1896.12	22.27	0.00	22.27	3.00	0.00	3.00
K-1	1960.70	2064.17	-103.47	-35.33	0.00	4.00	4.00	0.00
F-2	1593.65	1706.14	-112.49	-43.27	0.00	5.00	5.00	0.00
A-2	1596.30	1579.04	17.26	0.00	62.40	6.00	0.00	6.00
M11	1606.59	1760.95	-154.36	-71.20	0.00	7.00	7.00	0.00
G-2	1047.95	1329.03	-281.08	-103.47	0.00	8.00	8.00	0.00
G-3	1616.36	1841.50	-224.94	-112.49	0.00	9.00	9.00	0.00
S-3	1751.68	1689.28	62.40	-130.32	0.00	10.00	10.00	0.00
A-3	1553.97	1554.18	-0.21	-154.36	0.00	11.00	11.00	0.00
M13	1630.50	1665.83	-35.33	-192.27	0.00	12.00	12.00	0.00
M-2	1621.90	1665.17	-43.27	-224.94	0.00	13.00	13.00	0.00
F-3	1534.20	1664.52	-130.32	-281.08	0.00	14.00	14.00	0.00

MEAN A: 1642.26 STD DEV A: 235.48
MEAN B: 1731.33 STD DEV B: 219.56

SUM OF N MINUS: 94.00
SUM OF N PLUS : 11.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: RES SEAT FORCE

FUNCTION A = G: 10 CELL: A
FUNCTION B = G: 10 CELL: C

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	MAX N -	MAX N +
O-1	2030.11	2226.09	-195.98	-4.82	0.00	1.00	1.00	0.00
M10	1561.68	1634.33	-72.65	0.00	7.61	2.00	0.00	2.00
A-1	1951.14	1918.20	32.94	0.00	32.94	3.00	0.00	3.00
K-1	1982.09	2099.55	-117.46	-35.57	0.00	4.00	4.00	0.00
F-2	1630.68	1754.69	-124.01	-53.19	0.00	5.00	5.00	0.00
A-2	1605.33	1587.72	17.61	0.00	65.87	6.00	0.00	6.00
M11	1629.64	1789.99	-160.35	-72.65	0.00	7.00	7.00	0.00
G-2	1058.21	1338.79	-280.58	-117.46	0.00	8.00	8.00	0.00
G-3	1641.74	1861.29	-219.55	-124.01	0.00	9.00	9.00	0.00
S-3	1782.79	1716.92	65.87	-134.28	0.00	10.00	10.00	0.00
A-3	1565.65	1570.47	-4.82	-160.35	0.00	11.00	11.00	0.00
M13	1666.61	1702.18	-35.57	-195.98	0.00	12.00	12.00	0.00
M-2	1632.87	1686.06	-53.19	-219.55	0.00	13.00	13.00	0.00
F-3	1556.65	1690.93	-134.28	-280.58	0.00	14.00	14.00	0.00

MEAN A: 1663.94 STD DEV A: 238.20
MEAN B: 1755.52 STD DEV B: 222.35

SUM OF N MINUS: 94.00
SUM OF N PLUS : 11.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL FOOT X

FUNCTION A = G: 10 CELL: A MIN
FUNCTION B = G: 10 CELL: C MIN

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
D-1	-944.80	-571.22	-373.58	-3.80	0.00	1.00	1.00	0.00
M10	-475.94	-353.10	-122.84	0.00	50.85	2.00	0.00	2.00
A-1	-680.89	-677.09	-3.80	-56.32	0.00	3.00	3.00	0.00
K-1	-508.90	-296.95	-211.95	-61.73	0.00	4.00	4.00	0.00
F-2	-481.47	-425.15	-56.32	-80.42	0.00	5.00	5.00	0.00
A-2	-444.18	-495.03	50.85	-122.84	0.00	6.00	6.00	0.00
M11	-461.90	-334.84	-127.06	-124.68	0.00	7.00	7.00	0.00
G-2	-558.49	-246.99	-311.50	-127.06	0.00	8.00	8.00	0.00
G-3	-462.40	-337.72	-124.68	-164.43	0.00	9.00	9.00	0.00
S-3	-362.52	-282.10	-80.42	-179.69	0.00	10.00	10.00	0.00
A-3	-361.98	-300.25	-61.73	-211.95	0.00	11.00	11.00	0.00
M13	-578.49	-414.06	-164.43	-311.50	0.00	12.00	12.00	0.00
M-2	-635.96	-312.88	-323.08	-323.08	0.00	13.00	13.00	0.00
F-3	-543.43	-363.74	-179.69	-373.58	0.00	14.00	14.00	0.00

MEAN A: -535.81 STD DEV A: 148.71 SUM OF N MINUS: 105.00
MEAN B: -386.51 STD DEV B: 121.06 SUM OF N PLUS : 2.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL FOOT Z

FUNCTION A = G: 10 CELL: A MAX
FUNCTION B = G: 10 CELL: C MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
D-1	744.50	599.02	145.48	0.00	70.56	1.00	0.00	1.00
M10	502.76	445.71	57.05	0.00	41.26	2.00	0.00	2.00
A-1	633.32	622.76	10.56	0.00	24.14	3.00	0.00	3.00
K-1	546.82	431.87	114.95	0.00	34.64	4.00	0.00	4.00
F-2	597.93	537.13	60.80	0.00	57.05	5.00	0.00	5.00
A-2	464.41	430.27	34.14	0.00	60.80	6.00	0.00	6.00
M11	475.90	464.64	11.26	0.00	67.90	7.00	0.00	7.00
G-2	502.68	389.29	113.39	0.00	72.43	8.00	0.00	8.00
G-3	442.55	370.12	72.43	0.00	101.32	9.00	0.00	9.00
S-3	514.60	446.70	67.90	0.00	113.22	10.00	0.00	10.00
A-3	450.59	423.95	34.64	0.00	113.39	11.00	0.00	11.00
M13	597.23	484.01	113.22	0.00	114.95	12.00	0.00	12.00
M-2	560.97	431.83	129.14	0.00	129.14	13.00	0.00	13.00
F-3	527.22	425.90	101.32	0.00	145.48	14.00	0.00	14.00

MEAN A: 540.65 STD DEV A: 81.89 SUM OF N MINUS: 0.00
MEAN B: 464.51 STD DEV B: 73.63 SUM OF N PLUS : 105.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: RES FOOT FORCE

FUNCTION A = G: 10 CELL: A ABS
FUNCTION B = G: 10 CELL: C ABS

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
D-1	1153.58	765.67	387.91	-16.97	0.00	1.00	1.00	0.00
M10	611.03	515.64	95.39	0.00	30.30	2.00	0.00	2.00
R-1	868.36	838.06	30.30	0.00	35.39	3.00	0.00	3.00
K-1	707.32	468.29	239.03	0.00	76.59	4.00	0.00	4.00
F-2	710.80	616.31	94.49	0.00	94.49	5.00	0.00	5.00
R-2	568.80	585.77	-16.97	0.00	95.39	6.00	0.00	6.00
M11	639.24	504.75	134.49	0.00	134.49	7.00	0.00	7.00
G-2	646.32	395.06	251.26	0.00	138.64	8.00	0.00	8.00
G-3	603.53	464.89	138.64	0.00	213.02	9.00	0.00	9.00
S-3	558.65	482.06	76.59	0.00	230.36	10.00	0.00	10.00
R-3	516.44	481.05	35.39	0.00	239.03	11.00	0.00	11.00
M12	800.50	570.14	230.36	0.00	251.26	12.00	0.00	12.00
M-2	823.69	504.36	319.33	0.00	319.33	13.00	0.00	13.00
F-3	728.44	515.42	213.02	0.00	387.91	14.00	0.00	14.00

MEAN A: 709.76 STD DEV A: 164.97 SUM OF N MINUS: 1.00
MEAN B: 550.53 STD DEV B: 120.69 SUM OF N PLUS : 104.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CHEST X

FUNCTION A = G: 10 CELL: B MIN
FUNCTION B = G: 10 CELL: D MIN

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
S-3	-1.93	-1.71	-0.22	0.00	0.08	1.00	0.00	1.00
G-3	-2.74	-3.44	0.70	-0.22	0.00	2.00	0.00	2.00
R-3	-0.67	-2.28	1.61	0.00	0.23	3.00	0.00	3.00
D-1	-0.96	-1.67	0.71	0.00	0.25	4.00	0.00	4.00
G-2	-1.07	-0.72	-0.35	-0.35	0.00	5.00	5.00	0.00
F-3	-1.93	-2.31	0.38	0.00	0.38	6.00	0.00	6.00
M11	-2.48	-3.28	0.80	0.00	0.56	7.00	0.00	7.00
F-2	-0.97	-1.78	0.81	0.00	0.70	8.00	0.00	8.00
M10	-1.26	-1.51	0.25	0.00	0.71	9.00	0.00	9.00
M13	-1.54	-1.77	0.23	0.00	0.80	10.00	0.00	10.00
M-2	-2.83	-3.39	0.56	0.00	0.81	11.00	0.00	11.00
K-1	-0.85	-2.35	1.50	0.00	1.50	12.00	0.00	12.00
R-2	-0.43	-0.51	0.08	0.00	1.61	13.00	0.00	13.00

MEAN A: -1.51 STD DEV A: 0.80 SUM OF N MINUS: 7.00
MEAN B: -2.06 STD DEV B: 0.93 SUM OF N PLUS : 84.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD Z

FUNCTION A = G: 10 CELL: B MAX
FUNCTION B = G: 10 CELL: D MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
S-3	13.90	13.34	0.56	-0.09	0.00	1.00	1.00	0.00
G-3	12.12	11.85	0.27	0.00	0.11	2.00	0.00	2.00
R-3	13.71	11.91	1.80	0.00	0.14	3.00	0.00	3.00
D-1	13.05	12.47	0.58	-0.21	0.00	4.00	4.00	0.00
G-2	14.26	12.66	1.60	0.00	0.27	5.00	0.00	5.00
F-3	12.04	12.25	-0.21	0.00	0.48	6.00	0.00	6.00
M11	14.54	14.40	0.14	0.00	0.56	7.00	0.00	7.00
F-2	13.89	13.41	0.48	0.00	0.58	8.00	0.00	8.00
M10	13.43	14.19	-0.76	0.00	0.73	9.00	0.00	9.00
M13	13.10	12.99	0.11	-0.76	0.00	10.00	10.00	0.00
M-2	11.73	11.82	-0.09	0.00	1.23	11.00	0.00	11.00
K-1	12.50	11.77	0.73	0.00	1.60	12.00	0.00	12.00
R-2	13.78	12.55	1.23	0.00	1.80	13.00	0.00	13.00

MEAN A: 13.23 STD DEV A: 0.90 SUM OF N MINUS: 15.00
MEAN B: 12.74 STD DEV B: 0.88 SUM OF N PLUS : 76.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD RES

FUNCTION A = G: 10 CELL: B ABS
FUNCTION B = G: 10 CELL: D ABS

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
S-3	14.30	13.74	0.56	-0.17	0.00	1.00	1.00	0.00
G-3	12.19	11.91	0.28	0.00	0.28	2.00	0.00	2.00
R-3	13.76	12.25	1.51	0.00	0.32	3.00	0.00	3.00
D-1	13.18	12.57	0.61	-0.34	0.00	4.00	4.00	0.00
G-2	14.30	12.72	1.58	-0.40	0.00	5.00	5.00	0.00
F-3	12.38	12.78	-0.40	-0.45	0.00	6.00	6.00	0.00
M11	14.67	14.84	-0.17	0.00	0.49	7.00	0.00	7.00
F-2	14.01	13.69	0.32	0.00	0.56	8.00	0.00	8.00
M10	14.09	14.43	-0.34	0.00	0.61	9.00	0.00	9.00
M13	13.14	13.59	-0.45	0.00	0.97	10.00	0.00	10.00
M-2	12.40	11.91	0.49	0.00	1.19	11.00	0.00	11.00
K-1	12.81	11.84	0.97	0.00	1.51	12.00	0.00	12.00
R-2	13.79	12.60	1.19	0.00	1.58	13.00	0.00	13.00

MEAN A: 13.46 STD DEV A: 0.83 SUM OF N MINUS: 16.00
MEAN B: 12.99 STD DEV B: 0.98 SUM OF N PLUS : 75.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SHLD REFL

FUNCTION A = G: 10 CELL: B
FUNCTION B = G: 10 CELL: D

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	MAX N -	MAX N +
S-3	118.11	105.59	12.52	-1.45	0.00	1.00	1.00	0.00
G-3	126.99	140.36	-13.37	0.00	4.19	2.00	0.00	2.00
R-3	73.06	91.14	-18.08	0.00	12.32	3.00	0.00	3.00
D-1	106.23	93.91	12.32	0.00	12.52	4.00	0.00	4.00
G-2	78.30	79.75	-1.45	-13.37	0.00	5.00	5.00	0.00
F-3	104.38	145.78	-41.40	-18.08	0.00	6.00	6.00	0.00
M11	88.52	107.28	-18.76	-18.76	0.00	7.00	7.00	0.00
F-2	80.71	113.07	-32.36	-19.69	0.00	8.00	8.00	0.00
M10	62.87	94.47	-31.60	-25.73	0.00	9.00	9.00	0.00
M13	99.51	95.32	4.19	-31.60	0.00	10.00	10.00	0.00
M-2	81.58	101.27	-19.69	-32.36	0.00	11.00	11.00	0.00
K-1	73.31	99.04	-25.73	-41.22	0.00	12.00	12.00	0.00
A-2	87.01	128.23	-41.22	-41.40	0.00	13.00	13.00	0.00

MEAN A: 90.81 STD DEV A: 18.97 SUM OF N MINUS: 82.00
MEAN B: 107.32 STD DEV B: 19.71 SUM OF N PLUS : 9.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SHLD RECL

FUNCTION A = G: 10 CELL: B
FUNCTION B = G: 10 CELL: D

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	MAX N -	MAX N +
S-3	106.66	84.55	22.11	-3.20	0.00	1.00	1.00	0.00
G-3	98.73	123.58	-24.85	0.00	5.76	2.00	0.00	2.00
R-3	37.31	118.15	-80.84	-16.00	0.00	3.00	3.00	0.00
D-1	69.16	87.59	-18.43	-17.04	0.00	4.00	4.00	0.00
G-2	60.91	76.91	-16.00	-18.43	0.00	5.00	5.00	0.00
F-3	99.32	122.11	-22.79	0.00	22.11	6.00	0.00	6.00
M11	96.67	99.87	-3.20	-22.79	0.00	7.00	7.00	0.00
F-2	77.97	112.21	-34.24	-24.85	0.00	8.00	8.00	0.00
M10	60.59	77.63	-17.04	-34.24	0.00	9.00	9.00	0.00
M13	86.10	79.34	6.76	-34.69	0.00	10.00	10.00	0.00
M-2	77.28	124.42	-47.14	-37.01	0.00	11.00	11.00	0.00
K-1	68.04	102.73	-34.69	-47.14	0.00	12.00	12.00	0.00
A-2	62.66	99.67	-37.01	-80.84	0.00	13.00	13.00	0.00

MEAN A: 77.03 STD DEV A: 19.94 SUM OF N MINUS: 83.00
MEAN B: 100.67 STD DEV B: 18.20 SUM OF N PLUS : 8.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SHOULDER

FUNCTION A = G: 10 CELL: B MAX
FUNCTION B = G: 10 CELL: D MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
S-3	223.37	182.50	40.87	-9.15	0.00	1.00	1.00	0.00
G-3	225.22	261.91	-36.69	0.00	13.07	2.00	0.00	2.00
R-3	98.22	206.60	-108.38	-15.13	0.00	3.00	3.00	0.00
D-1	161.97	171.12	-9.15	-17.89	0.00	4.00	4.00	0.00
G-2	132.10	149.99	-17.89	-36.69	0.00	5.00	5.00	0.00
F-3	196.28	267.89	-71.61	0.00	40.87	6.00	0.00	6.00
M11	182.46	197.59	-15.13	-46.88	0.00	7.00	7.00	0.00
F-2	136.69	223.05	-86.36	-71.61	0.00	8.00	8.00	0.00
M10	114.26	161.14	-46.88	-73.77	0.00	9.00	9.00	0.00
M13	181.73	168.66	13.07	-76.30	0.00	10.00	10.00	0.00
M-2	151.28	225.05	-73.77	-86.36	0.00	11.00	11.00	0.00
K-1	107.22	199.08	-91.86	-91.86	0.00	12.00	12.00	0.00
R-2	146.92	223.22	-76.30	-108.38	0.00	13.00	13.00	0.00

MEAN A: 158.29 STD DEV A: 41.62 SUM OF N MINUS: 83.00
MEAN B: 202.91 STD DEV B: 36.76 SUM OF N PLUS : 8.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SEAT Z

FUNCTION A = G: 10 CELL: B MAX
FUNCTION B = G: 10 CELL: D MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
S-3	1753.39	1784.78	-31.40	0.00	14.17	1.00	0.00	1.00
G-3	1663.42	1696.38	-32.96	-17.04	0.00	2.00	2.00	0.00
R-3	1572.24	1558.07	14.17	-19.60	0.00	3.00	3.00	0.00
D-1	2006.65	2157.95	-151.30	-31.40	0.00	4.00	4.00	0.00
G-2	1143.51	1346.44	-202.93	-32.96	0.00	5.00	5.00	0.00
F-3	1461.49	1515.37	-53.88	-34.94	0.00	6.00	6.00	0.00
M11	1646.17	1754.04	-107.87	-39.18	0.00	7.00	7.00	0.00
F-2	1613.10	1632.70	-19.60	-53.88	0.00	8.00	8.00	0.00
M10	1527.30	1586.21	-58.91	-58.91	0.00	9.00	9.00	0.00
M13	1654.81	1671.85	-17.04	-107.87	0.00	10.00	10.00	0.00
M-2	1661.58	1696.52	-34.94	-151.30	0.00	11.00	11.00	0.00
K-1	1824.31	1980.32	-156.01	-156.01	0.00	12.00	12.00	0.00
R-2	1530.01	1569.19	-39.18	-202.93	0.00	13.00	13.00	0.00

MEAN A: 1619.84 STD DEV A: 201.19 SUM OF N MINUS: 90.00
MEAN B: 1688.45 STD DEV B: 206.42 SUM OF N PLUS : 1.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: RES SEAT FORCE

FUNCTION A = G: 10 CELL: B MAX
FUNCTION B = G: 10 CELL: D MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
S-3	1780.42	1811.34	-30.92	-12.53	0.00	1.00	1.00	0.00
G-3	1686.50	1711.49	-24.99	0.00	15.83	2.00	0.00	2.00
R-3	1591.42	1575.59	15.83	-22.08	0.00	3.00	3.00	0.00
D-1	2012.48	2169.89	-157.41	-24.99	0.00	4.00	4.00	0.00
G-2	1148.93	1354.76	-205.83	-30.92	0.00	5.00	5.00	0.00
F-3	1472.54	1534.18	-61.64	-30.98	0.00	6.00	6.00	0.00
M11	1673.09	1779.36	-106.27	-39.73	0.00	7.00	7.00	0.00
F-2	1645.51	1667.59	-22.08	-61.64	0.00	8.00	8.00	0.00
M10	1543.03	1607.30	-64.27	-64.27	0.00	9.00	9.00	0.00
M13	1693.96	1706.49	-12.53	-106.27	0.00	10.00	10.00	0.00
M-2	1681.00	1711.98	-30.98	-157.41	0.00	11.00	11.00	0.00
K-1	1844.09	2010.67	-166.58	-166.58	0.00	12.00	12.00	0.00
R-2	1539.00	1578.73	-39.73	-205.83	0.00	13.00	13.00	0.00

MEAN A: 1639.38 STD DEV A: 203.95 SUM OF N MINUS: 89.00
MEAN B: 1709.18 STD DEV B: 208.52 SUM OF N PLUS : 2.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL FOOT X

FUNCTION A = G: 10 CELL: B MIN
FUNCTION B = G: 10 CELL: D MIN

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
S-3	-499.05	-281.03	-218.02	-15.64	0.00	1.00	1.00	0.00
G-3	-377.77	-322.22	-55.55	-21.93	0.00	2.00	2.00	0.00
R-3	-324.75	-294.12	-30.63	-30.63	0.00	3.00	3.00	0.00
D-1	-782.82	-525.60	-257.22	-49.08	0.00	4.00	4.00	0.00
G-2	-400.06	-279.56	-120.50	-55.55	0.00	5.00	5.00	0.00
F-3	-863.92	-555.48	-308.44	-59.83	0.00	6.00	6.00	0.00
M11	-445.37	-375.30	-70.07	-70.07	0.00	7.00	7.00	0.00
F-2	-409.45	-387.52	-21.93	-88.80	0.00	8.00	8.00	0.00
M10	-436.27	-387.19	-49.08	-120.50	0.00	9.00	9.00	0.00
M13	-526.29	-466.46	-59.83	-218.02	0.00	10.00	10.00	0.00
M-2	-452.08	-436.44	-15.64	-235.84	0.00	11.00	11.00	0.00
K-1	-589.47	-353.63	-235.84	-257.22	0.00	12.00	12.00	0.00
R-2	-499.35	-410.55	-88.80	-308.44	0.00	13.00	13.00	0.00

MEAN A: -508.20 STD DEV A: 156.37 SUM OF N MINUS: 91.00
MEAN B: -390.39 STD DEV B: 88.32 SUM OF N PLUS : 0.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL FOOT Z

FUNCTION A = G: 10 CELL: B MAX
FUNCTION B = G: 10 CELL: D MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
S-3	558.45	487.39	71.06	-3.60	0.00	1.00	1.00	0.00
G-3	456.19	436.65	19.54	0.00	19.54	2.00	0.00	2.00
R-3	455.63	395.33	60.30	0.00	38.41	3.00	0.00	3.00
O-1	678.79	615.05	63.74	0.00	39.76	4.00	0.00	4.00
G-2	430.54	392.13	38.41	0.00	58.52	5.00	0.00	5.00
F-3	645.09	509.57	136.52	0.00	58.69	6.00	0.00	6.00
M11	473.72	385.85	87.87	0.00	60.30	7.00	0.00	7.00
F-2	541.41	545.01	-3.60	0.00	63.40	8.00	0.00	8.00
M10	495.17	455.41	39.76	0.00	63.74	9.00	0.00	9.00
M13	618.26	559.74	58.52	0.00	71.06	10.00	0.00	10.00
M-2	581.84	523.15	58.69	0.00	87.87	11.00	0.00	11.00
K-1	593.68	489.99	103.69	0.00	103.69	12.00	0.00	12.00
R-2	471.45	408.05	63.40	0.00	136.52	13.00	0.00	13.00

MEAN A: 538.48 STD DEV A: 80.93 SUM OF N MINUS: 1.00
MEAN B: 477.10 STD DEV B: 72.43 SUM OF N PLUS : 90.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: RES FOOT FORCE

FUNCTION A = G: 10 CELL: B ABS
FUNCTION B = G: 10 CELL: D ABS

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
S-3	741.44	554.77	186.67	0.00	41.22	1.00	0.00	1.00
G-3	570.21	528.17	42.04	0.00	41.85	2.00	0.00	2.00
R-3	548.73	425.05	123.68	0.00	42.04	3.00	0.00	3.00
O-1	986.56	764.08	222.58	0.00	51.16	4.00	0.00	4.00
G-2	527.28	444.92	82.36	0.00	76.87	5.00	0.00	5.00
F-3	1018.97	713.87	305.10	0.00	81.14	6.00	0.00	6.00
M11	643.47	530.18	113.29	0.00	82.36	7.00	0.00	7.00
F-2	648.94	607.72	41.22	0.00	113.29	8.00	0.00	8.00
M10	592.31	541.15	51.16	0.00	123.68	9.00	0.00	9.00
M13	779.54	702.67	76.87	0.00	186.67	10.00	0.00	10.00
M-2	685.87	644.02	41.85	0.00	207.92	11.00	0.00	11.00
K-1	729.68	521.76	207.92	0.00	222.58	12.00	0.00	12.00
R-2	645.12	563.98	81.14	0.00	305.10	13.00	0.00	13.00

MEAN A: 701.40 STD DEV A: 153.56 SUM OF N MINUS: 0.00
MEAN B: 580.18 STD DEV B: 102.04 SUM OF N PLUS : 91.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CHEST SI

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: E MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
D-1	27.57	42.67	-15.10	-0.23	0.00	1.00	1.00	0.00
K-1	37.60	41.03	-3.43	-0.27	0.00	2.00	2.00	0.00
G-3	38.79	46.87	-8.08	-0.48	0.00	3.00	3.00	0.00
F-3	27.58	37.64	-10.06	0.00	0.69	4.00	0.00	4.00
A-2	32.99	33.47	-0.48	-3.43	0.00	5.00	5.00	0.00
S-3	43.06	43.33	-0.27	0.00	4.68	6.00	0.00	6.00
F-2	38.10	54.90	-16.80	-4.92	0.00	7.00	7.00	0.00
G-2	35.13	30.45	4.68	-8.08	0.00	8.00	8.00	0.00
M13	47.31	47.54	-0.23	-8.15	0.00	9.00	9.00	0.00
M-2	33.38	41.53	-8.15	-10.06	0.00	10.00	10.00	0.00
R-3	27.34	32.26	-4.92	-12.15	0.00	11.00	11.00	0.00
M10	31.71	43.86	-12.15	-15.10	0.00	12.00	12.00	0.00
M11	39.65	38.96	0.69	-16.80	0.00	13.00	13.00	0.00

MEAN A: 35.40 STD DEV A: 6.15 SUM OF N MINUS: 81.00
MEAN B: 41.12 STD DEV B: 6.75 SUM OF N PLUS : 10.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD X

FUNCTION A = G: 10 CELL: C MIN
FUNCTION B = G: 10 CELL: E MIN

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
D-1	-4.62	-4.56	-0.06	-0.06	0.00	1.00	1.00	0.00
K-1	-6.03	-6.40	0.37	-0.33	0.00	2.00	2.00	0.00
G-3	-6.27	-5.58	-0.69	0.00	0.37	3.00	0.00	3.00
F-3	-3.95	-3.43	-0.52	-0.42	0.00	4.00	4.00	0.00
A-2	-4.49	-4.91	0.42	0.00	0.42	5.00	0.00	5.00
S-3	-4.02	-2.25	-1.77	0.00	0.49	6.00	0.00	6.00
F-2	-4.47	-4.14	-0.33	-0.52	0.00	7.00	7.00	0.00
G-2	-5.75	-4.78	-0.97	-0.64	0.00	8.00	8.00	0.00
M13	-5.38	-4.37	-1.01	-0.69	0.00	9.00	9.00	0.00
M-2	-5.99	-5.57	-0.42	-0.85	0.00	10.00	10.00	0.00
R-3	-5.39	-4.54	-0.85	-0.97	0.00	11.00	11.00	0.00
M10	-3.43	-2.79	-0.64	-1.01	0.00	12.00	12.00	0.00
M11	-3.93	-4.42	0.49	-1.77	0.00	13.00	13.00	0.00

MEAN A: -4.90 STD DEV A: 0.95 SUM OF N MINUS: 77.00
MEAN B: -4.44 STD DEV B: 1.13 SUM OF N PLUS : 14.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD Z

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: E MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
D-1	13.74	15.36	-1.62	0.00	0.22	1.00	0.00	1.00
K-1	12.31	12.93	-0.62	-0.31	0.00	2.00	2.00	0.00
G-3	13.02	16.13	-3.11	-0.62	0.00	3.00	3.00	0.00
F-3	13.56	13.87	-0.31	-0.65	0.00	4.00	4.00	0.00
R-2	14.21	14.86	-0.65	-1.01	0.00	5.00	5.00	0.00
S-3	13.69	15.53	-1.84	-1.05	0.00	6.00	6.00	0.00
F-2	14.62	16.88	-2.26	-1.62	0.00	7.00	7.00	0.00
G-2	12.39	14.05	-1.66	-1.66	0.00	8.00	8.00	0.00
M13	13.15	16.20	-3.05	-1.84	0.00	9.00	9.00	0.00
M-2	11.31	13.39	-2.08	-2.08	0.00	10.00	10.00	0.00
R-3	13.32	14.33	-1.01	-2.26	0.00	11.00	11.00	0.00
M10	14.37	15.42	-1.05	-3.05	0.00	12.00	12.00	0.00
M11	12.89	12.67	0.22	-3.11	0.00	13.00	13.00	0.00

MEAN A: 13.28 STD DEV A: 0.92 SUM OF N MINUS: 90.00 -------
MEAN B: 14.74 STD DEV B: 1.32 SUM OF N PLUS : ------- 1.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD RES

FUNCTION A = G: 10 CELL: C ABS
FUNCTION B = G: 10 CELL: E ABS

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
D-1	14.02	15.50	-1.48	0.00	0.28	1.00	0.00	1.00
K-1	12.43	13.28	-0.85	-0.39	0.00	2.00	2.00	0.00
G-3	13.03	16.17	-3.14	-0.52	0.00	3.00	3.00	0.00
F-3	13.58	13.97	-0.39	-0.85	0.00	4.00	4.00	0.00
R-2	14.41	14.93	-0.52	-1.23	0.00	5.00	5.00	0.00
S-3	13.87	16.26	-2.39	-1.27	0.00	6.00	6.00	0.00
F-2	14.02	17.24	-2.42	-1.48	0.00	7.00	7.00	0.00
G-2	12.42	14.20	-1.78	-1.78	0.00	8.00	8.00	0.00
M13	13.21	16.29	-3.08	-1.79	0.00	9.00	9.00	0.00
M-2	11.63	13.42	-1.79	-2.39	0.00	10.00	10.00	0.00
R-3	13.33	14.56	-1.23	-2.42	0.00	11.00	11.00	0.00
M10	14.49	15.76	-1.27	-3.08	0.00	12.00	12.00	0.00
M11	13.11	12.83	0.28	-3.14	0.00	13.00	13.00	0.00

MEAN A: 13.41 STD DEV A: 0.92 SUM OF N MINUS: 90.00 -------
MEAN B: 14.95 STD DEV B: 1.37 SUM OF N PLUS : ------- 1.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD SI

FUNCTION A = G: 10 CELL: C ABS
FUNCTION B = G: 10 CELL: E ABS

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
D-1	21.47	25.91	-4.44	-2.28	0.00	1.00	1.00	0.00
K-1	16.85	23.50	-6.65	-2.75	0.00	2.00	2.00	0.00
G-3	19.41	24.25	-4.84	-3.25	0.00	3.00	3.00	0.00
F-3	19.71	24.80	-5.09	-3.63	0.00	4.00	4.00	0.00
R-2	20.90	23.65	-2.75	-4.44	0.00	5.00	5.00	0.00
S-3	18.79	25.14	-6.35	-4.62	0.00	6.00	6.00	0.00
F-2	23.25	29.17	-5.92	-4.72	0.00	7.00	7.00	0.00
G-2	18.46	23.08	-4.62	-4.84	0.00	8.00	8.00	0.00
M13	19.61	26.51	-6.90	-5.08	0.00	9.00	9.00	0.00
M-2	15.06	18.69	-3.63	-5.92	0.00	10.00	10.00	0.00
R-3	19.22	22.47	-3.25	-6.35	0.00	11.00	11.00	0.00
M10	22.92	27.64	-4.72	-6.65	0.00	12.00	12.00	0.00
M11	18.80	21.16	-2.28	-6.90	0.00	13.00	13.00	0.00

MEAN A: 19.58 STD DEV A: 2.24 SUM OF N MINUS: 91.00
MEAN B: 24.31 STD DEV B: 2.75 SUM OF N PLUS : 0.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SHOULDER

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: E MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
D-1	189.95	166.57	23.38	-14.75	0.00	1.00	1.00	0.00
K-1	137.30	152.05	-14.75	0.00	23.38	2.00	0.00	2.00
G-3	256.32	130.38	125.94	0.00	25.23	3.00	0.00	3.00
F-3	259.04	159.65	99.39	0.00	32.41	4.00	0.00	4.00
R-2	120.70	95.47	25.23	0.00	37.38	5.00	0.00	5.00
S-3	209.19	121.02	88.17	0.00	46.14	6.00	0.00	6.00
F-2	240.70	162.83	77.87	0.00	53.27	7.00	0.00	7.00
G-2	167.12	91.13	75.99	0.00	75.99	8.00	0.00	8.00
M13	265.70	212.43	53.27	0.00	77.87	9.00	0.00	9.00
M-2	292.51	197.82	94.69	0.00	88.17	10.00	0.00	10.00
R-3	224.50	178.36	46.14	0.00	94.69	11.00	0.00	11.00
M10	133.52	96.14	37.38	0.00	99.39	12.00	0.00	12.00
M11	170.31	137.90	32.41	0.00	125.94	13.00	0.00	13.00

MEAN A: 205.14 STD DEV A: 56.44 SUM OF N MINUS: 1.00
MEAN B: 146.29 STD DEV B: 38.79 SUM OF N PLUS : 90.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL LAP

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: E MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
D-1	95.53	122.87	-27.34	-0.07	0.00	1.00	1.00	0.00
K-1	102.82	134.34	-31.52	-3.24	0.00	2.00	2.00	0.00
G-3	103.27	106.51	-3.24	-14.48	0.00	3.00	3.00	0.00
F-3	131.86	103.17	28.69	-16.76	0.00	4.00	4.00	0.00
A-2	73.47	102.95	-29.48	0.00	21.02	5.00	0.00	5.00
S-3	101.50	80.48	21.02	-23.07	0.00	6.00	6.00	0.00
F-2	62.81	85.88	-23.07	-27.34	0.00	7.00	7.00	0.00
G-2	54.69	71.45	-16.76	0.00	28.69	8.00	0.00	8.00
M13	59.03	127.93	-68.90	-29.48	0.00	9.00	9.00	0.00
M-2	91.44	146.56	-55.12	-31.52	0.00	10.00	10.00	0.00
A-3	125.24	125.31	-0.07	-37.34	0.00	11.00	11.00	0.00
M10	69.12	83.60	-14.48	-55.12	0.00	12.00	12.00	0.00
M11	80.26	117.60	-37.34	-68.90	0.00	13.00	13.00	0.00

MEAN A: 88.54 STD DEV A: 24.53 SUM OF N MINUS: 78.00
MEAN B: 108.36 STD DEV B: 23.13 SUM OF N PLUS : 13.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SEAT X

FUNCTION A = G: 10 CELL: C MIN
FUNCTION B = G: 10 CELL: E MIN

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
D-1	-265.36	-328.91	63.55	0.00	0.92	1.00	0.00	1.00
K-1	-389.61	-390.53	0.92	-8.89	0.00	2.00	2.00	0.00
G-3	-279.54	-301.97	22.43	0.00	8.87	3.00	0.00	3.00
F-3	-300.22	-319.09	18.87	0.00	19.50	4.00	0.00	4.00
A-2	-171.85	-210.54	38.69	0.00	22.43	5.00	0.00	5.00
S-3	-311.47	-370.49	59.02	0.00	23.64	6.00	0.00	6.00
F-2	-395.60	-458.20	62.60	0.00	38.69	7.00	0.00	7.00
G-2	-163.13	-166.77	23.64	0.00	42.22	8.00	0.00	8.00
M13	-344.28	-393.89	49.61	0.00	49.61	9.00	0.00	9.00
M-2	-267.07	-286.57	19.50	0.00	56.09	10.00	0.00	10.00
A-3	-213.48	-255.70	42.22	0.00	59.02	11.00	0.00	11.00
M10	-266.53	-322.62	56.09	0.00	62.60	12.00	0.00	12.00
M11	-330.65	-321.76	-8.89	0.00	63.55	13.00	0.00	13.00

MEAN A: -284.52 STD DEV A: 72.77 SUM OF N MINUS: 2.00
MEAN B: -319.00 STD DEV B: 74.98 SUM OF N PLUS : 89.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SEAT Z

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: E MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
D-1	2210.54	2298.59	-88.05	0.00	21.10	1.00	0.00	1.00
K-1	2064.17	2125.62	-61.45	0.00	30.78	2.00	0.00	2.00
G-3	1841.30	1983.98	-142.68	-57.06	0.00	3.00	3.00	0.00
F-3	1664.52	1721.58	-57.06	-61.45	0.00	4.00	4.00	0.00
A-2	1579.04	1679.60	-100.56	-72.47	0.00	5.00	5.00	0.00
S-3	1689.28	1884.95	-195.67	-88.05	0.00	6.00	6.00	0.00
F-2	1706.14	2094.88	-298.74	-90.85	0.00	7.00	7.00	0.00
G-2	1329.03	1307.93	21.10	-100.56	0.00	8.00	8.00	0.00
M13	1665.83	1738.30	-72.47	-103.65	0.00	9.00	9.00	0.00
M-2	1665.17	1755.02	-90.85	-107.09	0.00	10.00	10.00	0.00
A-3	1554.18	1697.83	-103.65	-142.68	0.00	11.00	11.00	0.00
M10	1612.33	1719.42	-107.09	-195.67	0.00	12.00	12.00	0.00
M11	1760.95	1730.17	30.78	-298.74	0.00	13.00	13.00	0.00

MEAN A: 1718.65 STD DEV A: 223.13 SUM OF N MINUS: 88.00
MEAN B: 1816.07 STD DEV B: 247.39 SUM OF N PLUS : 3.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: RES SEAT FORCE

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: E MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
D-1	2226.09	2322.76	-96.67	0.00	19.15	1.00	0.00	1.00
K-1	2099.55	2164.67	-65.12	0.00	29.74	2.00	0.00	2.00
G-3	1861.29	2010.23	-148.94	-60.67	0.00	3.00	3.00	0.00
F-3	1690.93	1751.50	-60.67	-65.12	0.00	4.00	4.00	0.00
A-2	1587.72	1692.18	-104.46	-77.86	0.00	5.00	5.00	0.00
S-3	1716.92	1921.48	-204.56	-93.54	0.00	6.00	6.00	0.00
F-2	1754.69	2059.05	-304.36	-96.67	0.00	7.00	7.00	0.00
G-2	1338.79	1319.64	19.15	-104.46	0.00	8.00	8.00	0.00
M13	1702.18	1780.04	-77.86	-108.62	0.00	9.00	9.00	0.00
M-2	1686.06	1779.60	-93.54	-116.71	0.00	10.00	10.00	0.00
A-3	1570.47	1679.09	-108.62	-148.94	0.00	11.00	11.00	0.00
M10	1634.33	1751.04	-116.71	-204.56	0.00	12.00	12.00	0.00
M11	1789.99	1760.25	29.74	-304.36	0.00	13.00	13.00	0.00

MEAN A: 1743.00 STD DEV A: 226.24 SUM OF N MINUS: 88.00
MEAN B: 1845.51 STD DEV B: 253.23 SUM OF N PLUS : 3.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL FOOT X

FUNCTION A = G: 10 CELL: C MIN
FUNCTION B = G: 10 CELL: E MIN

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
D-1	-571.22	-713.93	142.71	-1.38	0.00	1.00	1.00	0.00
K-1	-296.95	-338.36	41.41	0.00	1.80	2.00	0.00	2.00
G-3	-337.72	-336.34	-1.38	0.00	5.78	3.00	0.00	3.00
F-3	-363.74	-527.61	163.87	0.00	6.59	4.00	0.00	4.00
R-2	-495.03	-496.83	1.80	0.00	13.38	5.00	0.00	5.00
S-3	-282.10	-295.48	13.38	-29.63	0.00	6.00	6.00	0.00
F-2	-425.15	-430.93	5.78	0.00	39.64	7.00	0.00	7.00
G-2	-246.99	-345.34	98.35	0.00	41.41	8.00	0.00	8.00
M13	-414.06	-453.70	39.64	0.00	98.35	9.00	0.00	9.00
M-2	-312.88	-507.35	194.47	0.00	142.71	10.00	0.00	10.00
R-3	-300.25	-270.62	-29.63	0.00	163.87	11.00	0.00	11.00
M10	-353.10	-359.69	6.59	0.00	182.86	12.00	0.00	12.00
M11	-334.84	-517.70	182.86	0.00	194.47	13.00	0.00	13.00

MEAN A: -364.16 STD DEV A: 91.10 SUM OF N MINUS: 7.00
MEAN B: -430.30 STD DEV B: 123.03 SUM OF N PLUS : 84.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL FOOT Z

FUNCTION A = G: 10 CELL: C MAX
FUNCTION B = G: 10 CELL: E MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
D-1	599.02	634.60	-35.58	-4.14	0.00	1.00	1.00	0.00
K-1	431.87	436.01	-4.14	0.00	4.83	2.00	0.00	2.00
G-3	370.12	409.17	-39.05	-5.28	0.00	3.00	3.00	0.00
F-3	425.90	535.24	-109.34	-13.59	0.00	4.00	4.00	0.00
R-2	430.27	435.55	-5.28	0.00	19.35	5.00	0.00	5.00
S-3	446.70	514.97	-68.27	-30.19	0.00	6.00	6.00	0.00
F-2	537.13	567.32	-30.19	-35.58	0.00	7.00	7.00	0.00
G-2	389.29	384.46	4.83	-36.12	0.00	8.00	8.00	0.00
M13	484.01	520.13	-36.12	-39.05	0.00	9.00	9.00	0.00
M-2	431.83	507.96	-76.13	-68.27	0.00	10.00	10.00	0.00
R-3	423.95	337.16	86.79	-76.13	0.00	11.00	11.00	0.00
M10	445.71	459.30	-13.59	0.00	86.79	12.00	0.00	12.00
M11	464.64	445.29	19.35	-109.34	0.00	13.00	13.00	0.00

MEAN A: 452.34 STD DEV A: 60.21 SUM OF N MINUS: 72.00
MEAN B: 475.90 STD DEV B: 80.66 SUM OF N PLUS : 19.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: RES FOOT FORCE

FUNCTION A = G: 10 CELL: C ABS
FUNCTION B = G: 10 CELL: E ABS

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
D-1	765.67	921.60	-155.93	-4.90	0.00	1.00	1.00	0.00
K-1	468.29	522.58	-54.29	-38.62	0.00	2.00	2.00	0.00
G-3	464.89	529.79	-64.90	-41.62	0.00	3.00	3.00	0.00
F-3	515.42	709.55	-194.13	-54.29	0.00	4.00	4.00	0.00
R-2	585.77	624.39	-38.62	-64.90	0.00	5.00	5.00	0.00
S-3	482.06	591.18	-109.12	-72.10	0.00	6.00	6.00	0.00
F-2	616.31	657.93	-41.62	-101.42	0.00	7.00	7.00	0.00
G-2	395.06	467.16	-72.10	-109.12	0.00	8.00	8.00	0.00
M13	570.14	671.56	-101.42	0.00	114.17	9.00	0.00	9.00
M-2	504.36	655.92	-151.56	-151.56	0.00	10.00	10.00	0.00
R-3	481.05	366.88	114.17	-155.93	0.00	11.00	11.00	0.00
M10	515.64	520.54	-4.90	-169.91	0.00	12.00	12.00	0.00
M11	504.75	674.66	-169.91	-194.13	0.00	13.00	13.00	0.00

MEAN A: 528.42 STD DEV A: 91.44 SUM OF N MINUS: 82.00 -------
MEAN B: 608.75 STD DEV B: 135.86 SUM OF N PLUS : ------- 9.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CHEST X

FUNCTION A = G: 10 CELL: D MAX
FUNCTION B = G: 10 CELL: F MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
S-3	3.68	5.06	-1.38	-0.25	0.00	1.00	1.00	0.00
K-1	4.87	5.44	-0.57	-0.52	0.00	2.00	2.00	0.00
D-1	4.49	6.50	-2.01	-0.53	0.00	3.00	3.00	0.00
R-2	3.64	4.82	-1.18	-0.57	0.00	4.00	4.00	0.00
F-3	4.14	5.08	-0.94	-0.94	0.00	5.00	5.00	0.00
G-2	3.30	5.73	-2.43	-1.06	0.00	6.00	6.00	0.00
F-2	4.31	6.67	-2.36	-1.18	0.00	7.00	7.00	0.00
M11	3.49	3.74	-0.25	-1.38	0.00	8.00	8.00	0.00
M13	3.71	4.24	-0.53	-1.82	0.00	9.00	9.00	0.00
M-2	1.54	2.06	-0.52	-2.01	0.00	10.00	10.00	0.00
G-3	1.49	2.55	-1.06	-2.36	0.00	11.00	11.00	0.00
M10	5.70	7.52	-1.82	-2.43	0.00	12.00	12.00	0.00

MEAN A: 3.70 STD DEV A: 1.22 SUM OF N MINUS: 78.00 -------
MEAN B: 4.95 STD DEV B: 1.62 SUM OF N PLUS : ------- 0.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: CHEST SI

FUNCTION A = G: 10 CELL: D MAX
FUNCTION B = G: 10 CELL: F MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
S-3	36.05	39.10	-3.05	0.00	1.59	1.00	0.00	1.00
K-1	39.32	43.95	-4.63	-3.05	0.00	2.00	2.00	0.00
O-1	31.04	41.85	-10.81	-3.39	0.00	3.00	3.00	0.00
R-2	17.31	26.18	-8.87	-4.63	0.00	4.00	4.00	0.00
F-3	29.83	43.84	-14.01	-6.10	0.00	5.00	5.00	0.00
G-2	22.62	37.64	-15.02	-8.87	0.00	6.00	6.00	0.00
F-2	33.20	45.75	-12.55	-9.92	0.00	7.00	7.00	0.00
M11	39.30	42.69	-3.39	-10.81	0.00	8.00	8.00	0.00
M13	42.59	41.00	1.59	-12.55	0.00	9.00	9.00	0.00
M-2	37.20	47.12	-9.92	-13.45	0.00	10.00	10.00	0.00
G-3	29.44	42.89	-13.45	-14.01	0.00	11.00	11.00	0.00
M10	31.53	37.63	-6.10	-15.02	0.00	12.00	12.00	0.00

MEAN A: 32.45 STD DEV A: 7.25 SUM OF N MINUS: 77.00
MEAN B: 40.80 STD DEV B: 5.47 SUM OF N PLUS : 1.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: HEAD Z

FUNCTION A = G: 10 CELL: D MAX
FUNCTION B = G: 10 CELL: F MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
S-3	13.34	14.55	-1.21	-0.90	0.00	1.00	1.00	0.00
K-1	11.77	13.33	-1.56	-1.21	0.00	2.50	2.50	0.00
O-1	12.47	13.68	-1.21	-1.21	0.00	2.50	2.50	0.00
R-2	12.55	13.95	-1.40	-1.40	0.00	4.00	4.00	0.00
F-3	12.25	15.93	-3.68	-1.43	0.00	5.00	5.00	0.00
G-2	12.66	15.14	-2.48	-1.56	0.00	6.00	6.00	0.00
F-2	13.41	15.39	-1.98	-1.63	0.00	7.00	7.00	0.00
M11	14.40	16.03	-1.63	-1.98	0.00	8.00	8.00	0.00
M13	12.39	16.37	-3.98	-2.48	0.00	9.00	9.00	0.00
M-2	11.82	12.72	-0.90	-3.13	0.00	10.00	10.00	0.00
G-3	11.85	13.28	-1.43	-3.38	0.00	11.00	11.00	0.00
M10	14.19	17.32	-3.13	-3.68	0.00	12.00	12.00	0.00

MEAN A: 12.81 STD DEV A: 0.88 SUM OF N MINUS: 78.00
MEAN B: 14.81 STD DEV B: 1.44 SUM OF N PLUS : 0.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: MEAD RES

FUNCTION A = G: 10 CELL: D
FUNCTION B = G: 10 CELL: F

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	ABS N -	ABS N +
S-3	13.74	14.66	-0.92	-0.82	0.00	1.00	1.00	0.00
K-1	11.84	13.53	-1.69	-0.92	0.00	2.00	2.00	0.00
D-1	12.57	14.56	-1.99	-1.25	0.00	3.00	3.00	0.00
A-2	12.60	14.21	-1.61	-1.52	0.00	4.00	4.00	0.00
F-3	12.78	17.07	-4.29	-1.61	0.00	5.00	5.00	0.00
G-2	12.72	15.16	-2.44	-1.69	0.00	6.00	6.00	0.00
F-2	13.69	15.45	-1.76	-1.76	0.00	7.00	7.00	0.00
M11	14.84	16.09	-1.25	-1.99	0.00	8.00	8.00	0.00
M13	13.59	17.18	-3.59	-2.44	0.00	9.00	9.00	0.00
M-2	11.91	12.73	-0.82	-2.93	0.00	10.00	10.00	0.00
G-3	11.91	13.43	-1.52	-3.59	0.00	11.00	11.00	0.00
M10	14.43	17.36	-2.93	-4.29	0.00	12.00	12.00	0.00
							SUM OF N MINUS:	78.00
							SUM OF N PLUS :	0.00

MEAN A: 13.05 STD DEV A: 1.00
MEAN B: 15.12 STD DEV B: 1.55

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: MEAD SI

FUNCTION A = G: 10 CELL: D
FUNCTION B = G: 10 CELL: F

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	ABS N -	ABS N +
S-3	20.94	29.53	-8.59	-0.02	0.00	1.00	1.00	0.00
K-1	18.54	24.49	-5.95	-2.52	0.00	2.00	2.00	0.00
D-1	20.54	25.33	-4.79	-4.79	0.00	3.00	3.00	0.00
A-2	20.74	28.22	-7.48	-5.18	0.00	4.00	4.00	0.00
F-3	19.79	28.26	-8.47	-5.95	0.00	5.00	5.00	0.00
G-2	18.58	27.72	-9.14	-7.42	0.00	6.00	6.00	0.00
F-2	21.22	23.74	-2.52	-7.48	0.00	7.00	7.00	0.00
M11	23.10	31.31	-8.21	-8.21	0.00	8.00	8.00	0.00
M13	18.60	26.83	-8.23	-8.23	0.00	9.00	9.00	0.00
M-2	19.25	19.27	-0.02	-8.47	0.00	10.00	10.00	0.00
G-3	20.05	27.47	-7.42	-8.59	0.00	11.00	11.00	0.00
M10	22.43	27.61	-5.18	-9.14	0.00	12.00	12.00	0.00
							SUM OF N MINUS:	78.00
							SUM OF N PLUS :	0.00

MEAN A: 20.32 STD DEV A: 1.48
MEAN B: 26.65 STD DEV B: 3.12

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYS.3

ANALYSIS OF: TOTAL SHOULDER

FUNCTION A = G: 10 CELL: D MAX
FUNCTION B = G: 10 CELL: F MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
S-3	182.50	139.22	43.28	0.00	10.05	1.00	0.00	1.00
K-1	199.08	159.74	39.34	0.00	27.72	2.00	0.00	2.00
D-1	171.12	161.07	10.05	0.00	39.34	3.00	0.00	3.00
R-2	223.22	93.66	129.56	0.00	43.28	4.00	0.00	4.00
F-3	267.89	143.23	124.66	0.00	48.00	5.00	0.00	5.00
G-2	149.99	122.27	27.72	0.00	51.62	6.00	0.00	6.00
F-2	223.05	104.22	118.83	0.00	51.86	7.00	0.00	7.00
M11	197.59	120.77	76.82	0.00	60.72	8.00	0.00	8.00
M13	168.66	120.66	48.00	0.00	76.82	9.00	0.00	9.00
M-2	225.05	164.33	60.72	0.00	118.83	10.00	0.00	10.00
G-3	261.91	210.05	51.86	0.00	124.66	11.00	0.00	11.00
M10	161.14	109.52	51.62	0.00	129.56	12.00	0.00	12.00

MEAN A: 202.60 STD DEV A: 38.37 SUM OF N MINUS: 0.00
MEAN B: 137.40 STD DEV B: 32.58 SUM OF N PLUS : 78.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL LAP

FUNCTION A = G: 10 CELL: D MAX
FUNCTION B = G: 10 CELL: F MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
S-3	100.13	86.97	13.16	-1.71	0.00	1.00	1.00	0.00
K-1	115.72	138.23	-22.51	-6.77	0.00	2.00	2.00	0.00
D-1	90.94	125.18	-34.24	0.00	3.16	3.00	0.00	3.00
R-2	82.72	96.61	-13.89	-13.89	0.00	4.00	4.00	0.00
F-3	135.46	103.87	31.59	-22.09	0.00	5.00	5.00	0.00
G-2	80.19	113.47	-33.28	-22.51	0.00	6.00	6.00	0.00
F-2	102.43	166.90	-64.47	-29.74	0.00	7.00	7.00	0.00
M11	80.59	87.36	-6.77	0.00	31.59	8.00	0.00	8.00
M13	76.05	77.76	-1.71	-33.28	0.00	9.00	9.00	0.00
M-2	103.92	133.66	-29.74	-34.24	0.00	10.00	10.00	0.00
G-3	97.58	149.46	-51.88	-51.88	0.00	11.00	11.00	0.00
M10	86.44	108.53	-22.09	-64.47	0.00	12.00	12.00	0.00

MEAN A: 96.01 STD DEV A: 17.18 SUM OF N MINUS: 67.00
MEAN B: 115.67 STD DEV B: 27.49 SUM OF N PLUS : 11.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SEAT X

FUNCTION A = G: 10 CELL: D MIN
FUNCTION B = G: 10 CELL: F MIN

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
S-3	-312.67	-341.27	28.60	0.00	2.03	1.00	0.00	1.00
K-1	-355.24	-357.27	2.03	0.00	5.37	2.00	0.00	2.00
O-1	-234.66	-283.79	49.13	0.00	12.46	3.00	0.00	3.00
A-2	-185.70	-198.16	12.46	0.00	18.26	4.00	0.00	4.00
F-3	-238.38	-322.93	84.55	0.00	28.80	5.00	0.00	5.00
G-2	-157.80	-221.89	64.09	0.00	29.80	6.00	0.00	6.00
F-2	-332.76	-362.56	29.80	0.00	45.36	7.00	0.00	7.00
M11	-305.53	-310.90	5.37	0.00	49.13	8.00	0.00	8.00
M13	-368.71	-430.57	61.86	0.00	61.86	9.00	0.00	9.00
M-2	-235.05	-314.08	79.03	0.00	64.09	10.00	0.00	10.00
G-3	-229.75	-275.11	45.36	0.00	79.03	11.00	0.00	11.00
M10	-260.68	-278.94	18.26	0.00	84.55	12.00	0.00	12.00

MEAN A: -268.08 STD DEV A: 66.65 SUM OF N MINUS: 0.00
MEAN B: -308.12 STD DEV B: 63.10 SUM OF N PLUS : 78.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: TOTAL SEAT Z

FUNCTION A = G: 10 CELL: D MAX
FUNCTION B = G: 10 CELL: F MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
S-3	1784.78	1914.42	-129.64	-11.98	0.00	1.00	1.00	0.00
K-1	1980.32	2181.76	-201.44	-34.19	0.00	2.00	2.00	0.00
O-1	2157.95	2275.22	-117.27	-46.22	0.00	3.00	3.00	0.00
A-2	1569.19	1513.15	56.04	0.00	56.04	4.00	0.00	4.00
F-3	1515.37	1726.04	-210.67	-117.27	0.00	5.00	5.00	0.00
G-2	1346.44	1218.63	127.81	0.00	127.81	6.00	0.00	6.00
F-2	1632.70	1795.98	-163.28	-129.64	0.00	7.00	7.00	0.00
M11	1754.04	1788.23	-34.19	-135.79	0.00	8.00	8.00	0.00
M13	1671.85	1929.87	-258.02	-163.28	0.00	9.00	9.00	0.00
M-2	1696.52	1832.31	-135.79	-201.44	0.00	10.00	10.00	0.00
G-3	1698.38	1742.60	-46.22	-210.67	0.00	11.00	11.00	0.00
M10	1586.21	1598.19	-11.98	-258.02	0.00	12.00	12.00	0.00

MEAN A: 1699.31 STD DEV A: 211.68 SUM OF N MINUS: 68.00
MEAN B: 1793.03 STD DEV B: 281.54 SUM OF N PLUS : 10.00

*** SIGNIFICANT DIFFERENCE ***

WILCOXON ANALYSIS

ANALYSIS OF: RES SEAT FORCE

FUNCTION A = G: 10 CELL: D MAX
FUNCTION B = G: 10 CELL: F MAX

SUBJ	A VAL	B VAL	A-B	ORD -	ORD +	N	N -	N +
S-3	1811.34	1945.27	-133.93	-15.16	0.00	1.00	1.00	0.00
K-1	2010.67	2211.84	-201.17	-36.39	0.00	2.00	2.00	0.00
D-1	2169.89	2292.45	-122.56	-52.97	0.00	3.00	3.00	0.00
A-2	1578.73	1525.28	53.45	0.00	53.45	4.00	0.00	4.00
F-3	1534.18	1757.52	-223.34	0.00	116.18	5.00	0.00	5.00
G-2	1354.76	1238.58	116.18	-122.56	0.00	6.00	6.00	0.00
F-2	1667.59	1836.69	-169.10	-133.93	0.00	7.00	7.00	0.00
M11	1779.36	1815.75	-36.39	-148.90	0.00	8.00	8.00	0.00
M13	1706.49	1977.25	-270.76	-169.10	0.00	9.00	9.00	0.00
M-2	1711.98	1860.88	-148.90	-201.17	0.00	10.00	10.00	0.00
G-3	1711.49	1764.46	-52.97	-223.34	0.00	11.00	11.00	0.00
M10	1607.30	1622.46	-15.16	-270.76	0.00	12.00	12.00	0.00

MEAN A: 1720.32 STD DEV A: 213.71 SUM OF N MINUS: 69.00 -------
MEAN B: 1820.70 STD DEV B: 284.45 SUM OF N PLUS : ------- 9.00

*** SIGNIFICANT DIFFERENCE ***

APPENDIX D

SUMMARY OF PHOTOMETRIC DATA

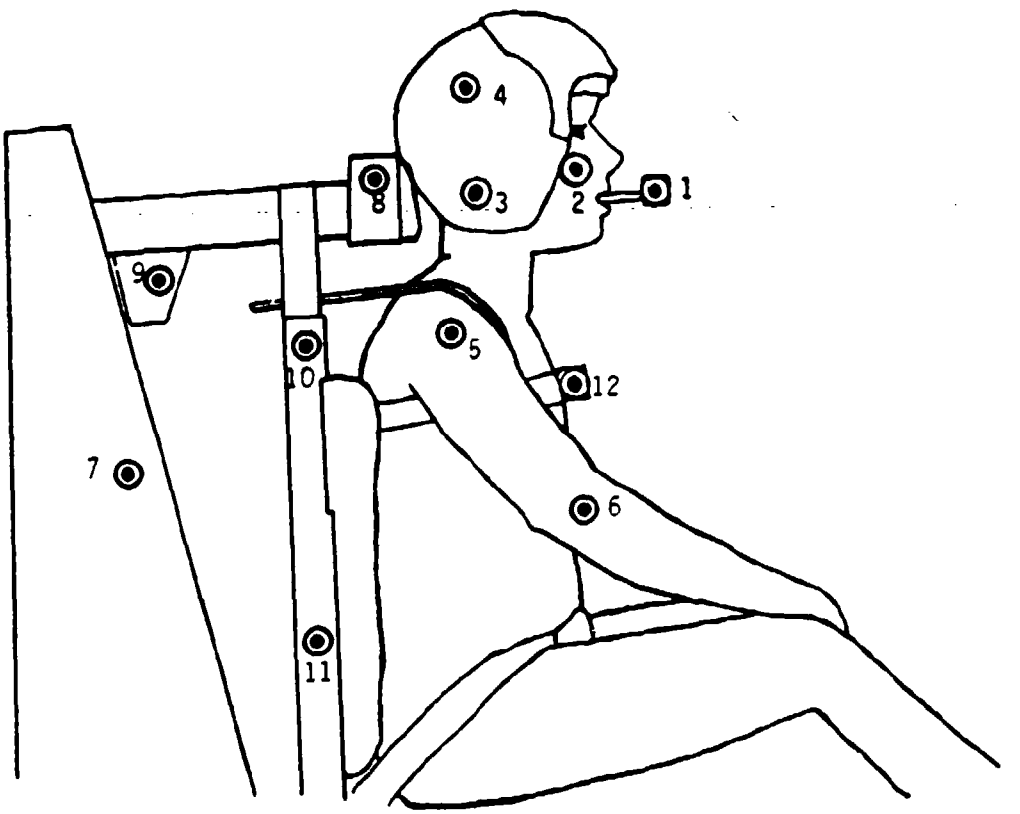
The photometric data obtained from this test program were analyzed to characterize the motions of photometric targets (fiducials) fixed to the test subject and thus describe the subject's dynamic response to impact. Reduction of the film data included digitization of target position information and computer plotting of the position-time, velocity-time, and acceleration-time history of each fiducial.

Fiducials were placed on subjects and the test fixture in accordance with the guidelines provided in "Film Analysis Guide for Dynamic Studies of Test Subjects" (SAE J138, March 1980). The positions of subject-mounted fiducials relative to reference fixture-mounted fiducials were documented for each subject prior to each test. The locations and number designations of each fiducial are shown in Figures D-1 and D-2. The distance between the "mouth pack" target (Target No. 1 in Figure D-1) and the center of the triaxial accelerometer in the mouth was four inches.

The photometric data were obtained by three 16 mm Milliken cameras, two mounted on the test carriage and one mounted off the carriage. The off-board camera and one on-board camera were positioned to provide a frontal view of the subject and the other on-board camera was positioned to provide a right lateral view of the subject. Each camera lens had a focal length of 10 mm. During the impact, the cameras were operated at 500 frames/sec.

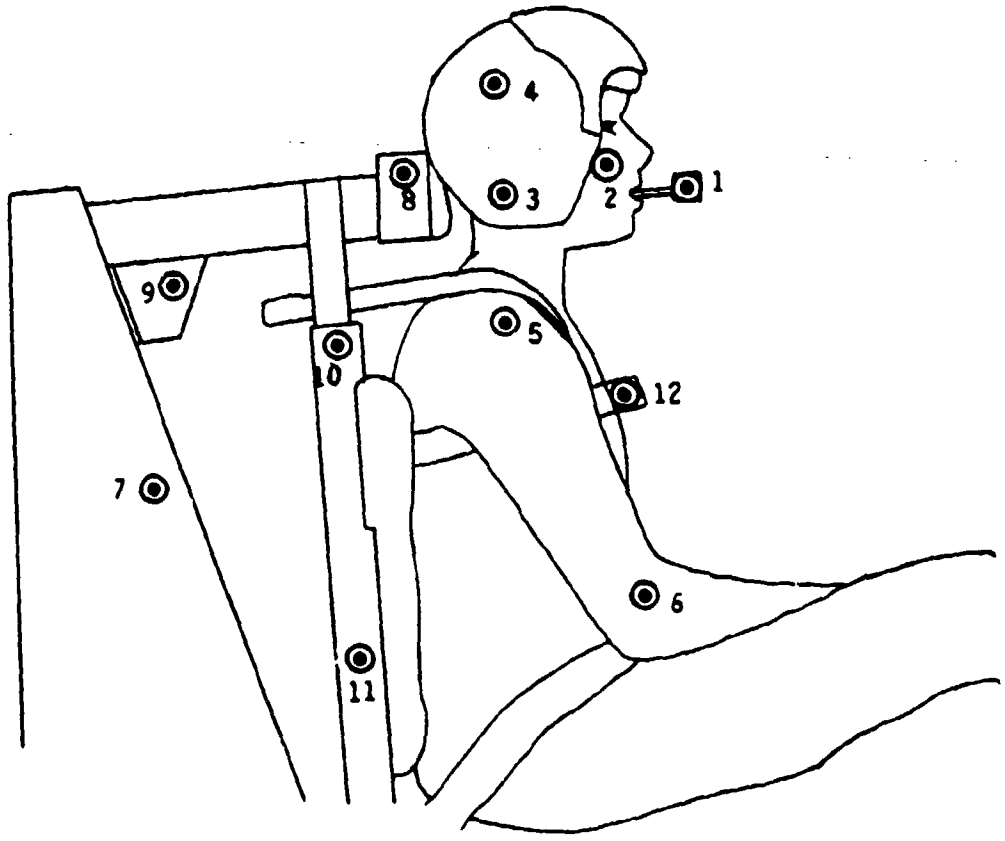
The Photo Digitizing Systems Model 200 processor consists of an Automatic Film Reader (AFR), an electronic scanning camera, and a Data General Corporation (DGC) Nova 3/12 computer. This system was utilized for target position digitization. The semi-automatic ARF is manually initialized by selecting, with a cursor, targets of interest in the first frame of data. Targets on subsequent frames are automatically scanned, acquired, and identified. The target coordinates are then digitized by the Nova computer and the digitized data are then stored on magnetic tape. The coordinate resolution of the ARF is 0.025% of the major film dimension.

These digitized data were then processed on the Control Data Corporation (CDC) Cyber 74 computer system. The computer analysis routine used to process the film data has been described elsewhere (Graf et al., 1978; Brinkley et al., 1981). The program permitted the graphic presentation of position-time, velocity-time, and acceleration-time histories of fiducials and abscissa-ordinate position histories as well. Typical graphic data from one cell of the experimental matrix are presented. In addition, the maximum vertical and horizontal displacements measured at the head and helmet are presented in Table D-1. As previously noted, data were not available for all tests conducted.



1.	Mouth Pack	7.	Upper Frame
2.	Cheek	8.	Front Headrest
3.	Lower Helmet	9.	Rear Headrest
4.	Upper Helmet	10.	Upper Seat Back
5.	Shoulder	11.	Lower Seat Back
6.	Elbow	12.	Chest Pack

Figure D-1. Location of Fiducials for Hands-On-Knees Position.



1.	Mouth Pack	7.	Upper Frame
2.	Cheek	8.	Front Headrest
3.	Lower Helmet	9.	Rear Headrest
4.	Upper Helmet	10.	Upper Seat Back
5.	Shoulder	11.	Lower Seat Back
6.	Elbow	12.	Chest Pack

Figure D-2. Location of Fiducials for Hands-In-Lap Position.

TABLE D-1

MAXIMUM HORIZONTAL AND VERTICAL DISPLACEMENTS (INCHES)
MEASURED AT THE HEAD AND HELMET FIDUCIALS

CELL OF MATRIX		A		B	
SUBJ	FIDUCIAL LOCATION	X_{MAX}	Z_{MAX}	X_{MAX}	Z_{MAX}
D-1	Cheek	1.69	1.66	0.46	1.37
	Upper Helmet	1.40	1.49	0.84	1.55
	Lower Helmet	1.60	1.39	0.51	1.62
E-1	Cheek				
	Upper Helmet				
	Lower Helmet				
F-3	Cheek	1.49	1.88	0.43	1.77
	Upper Helmet	1.15	2.60	0.32	2.52
	Lower Helmet	1.49	2.41	1.20	2.59
F-2	Cheek	1.06	1.66	0.86	1.63
	Upper Helmet	1.46	1.30	0.69	1.79
	Lower Helmet	1.15	1.34	1.05	1.69
G-3	Cheek			0.94	1.64
	Upper Helmet			0.64	3.20
	Lower Helmet			1.24	2.87
G-2	Cheek	1.43	2.29	1.34	2.02
	Upper Helmet	2.04	2.09	1.65	2.15
	Lower Helmet	1.59	2.00	1.22	2.22
K-1	Cheek	1.74	1.99	1.07	1.89
	Upper Helmet	2.91	1.71	1.31	1.68
	Lower Helmet	2.03	1.71	1.20	1.81
M-2	Cheek				
	Upper Helmet				
	Lower Helmet				
M10	Cheek	1.05	1.75	0.56	1.55
	Upper Helmet	0.95	1.13	0.37	1.81
	Lower Helmet	1.19	1.38	0.72	1.63
M11	Cheek	2.20	2.40	1.17	1.87
	Upper Helmet	3.04	1.75	1.01	2.31
	Lower Helmet	2.08	1.94	1.14	2.23
M13	Cheek	0.57	1.84	0.71	1.78
	Upper Helmet	0.50	2.42	0.68	2.50
	Lower Helmet	0.70	2.35	0.48	2.26
R-2	Cheek	1.56	2.10	0.90	1.60
	Upper Helmet	3.13	1.20	0.92	1.18
	Lower Helmet	2.06	1.39	1.12	1.36
R-3	Cheek				
	Upper Helmet				
	Lower Helmet				
S-3	Cheek	1.63	2.01	0.66	1.61
	Upper Helmet	1.82	2.01	0.28	2.31
	Lower Helmet	1.43	1.92	0.63	2.16

TABLE D-1 (continued)

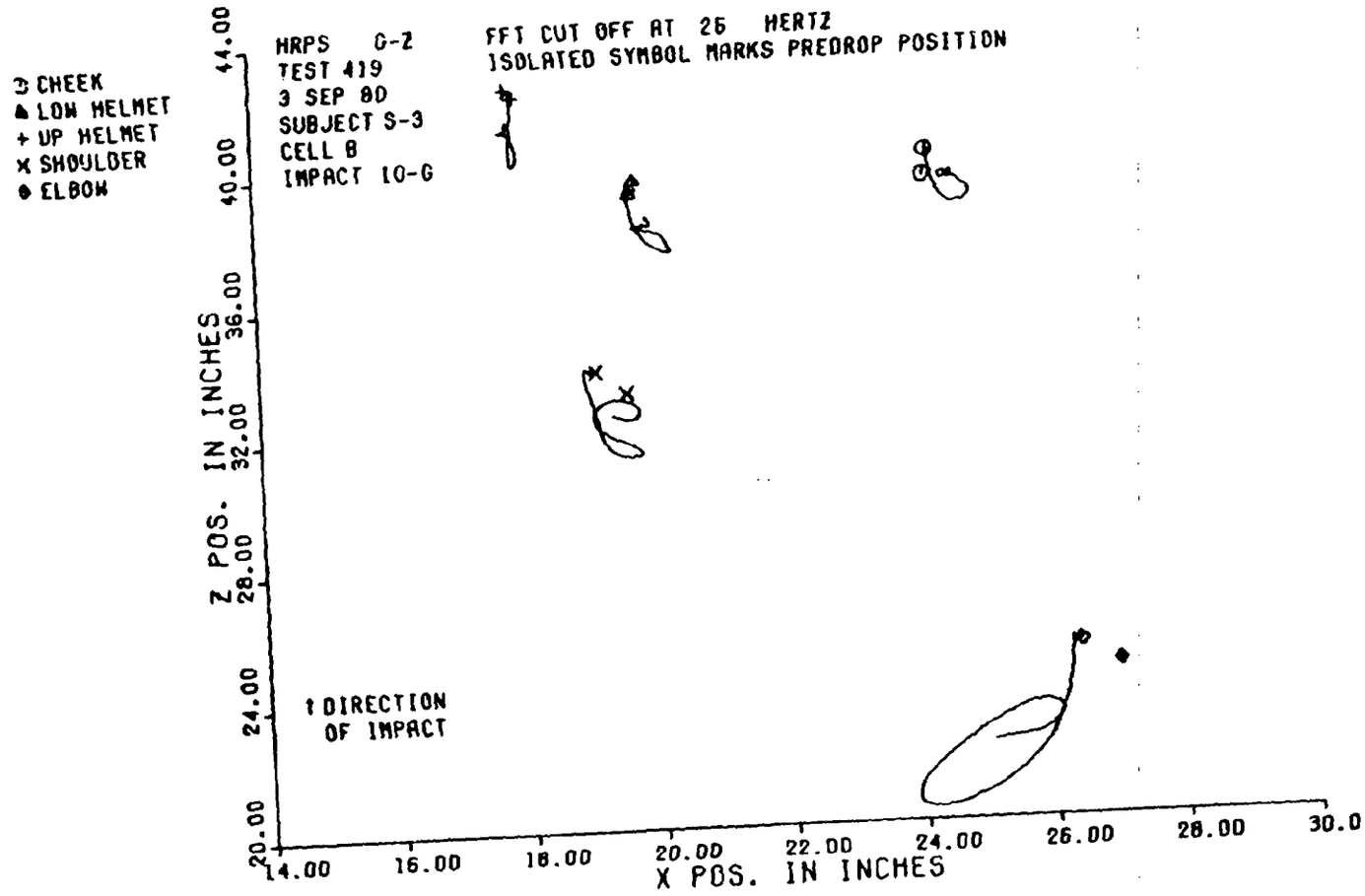
MAXIMUM HORIZONTAL AND VERTICAL DISPLACEMENTS (INCHES)
MEASURED AT THE HEAD AND HELMET FIDUCIALS

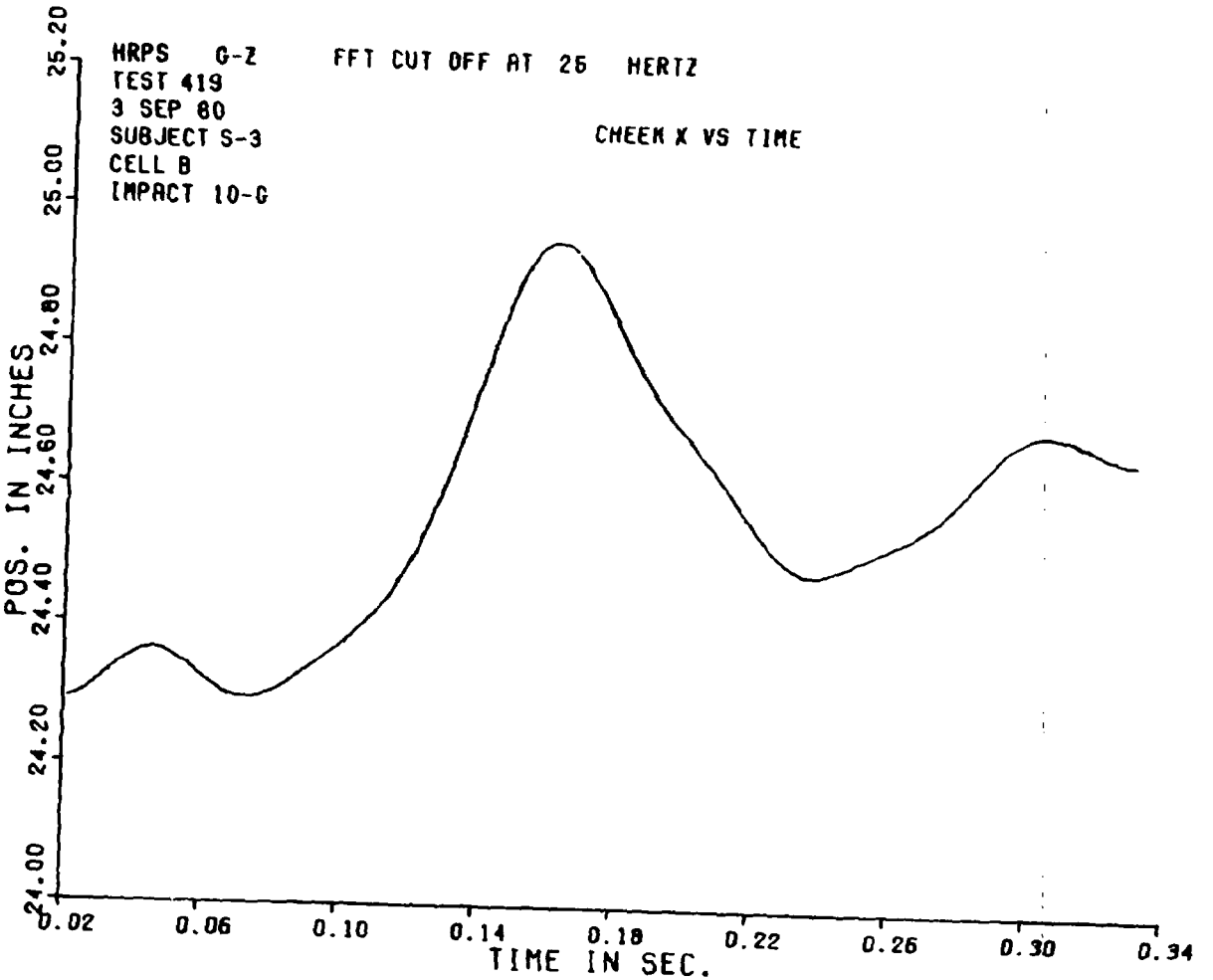
CELL OF MATRIX		C		D	
SUBJ	FIDUCIAL LOCATION	X_{MAX}	Z_{MAX}	X_{MAX}	Z_{MAX}
D-1	Cheek	0.98	1.35	0.40	1.51
	Upper Helmet	0.71	1.08	0.63	1.70
	Lower Helmet	1.04	0.94	0.55	1.66
E-1	Cheek			3.31	2.55
	Upper Helmet			4.64	2.61
	Lower Helmet			3.56	2.66
F-3	Cheek	1.01	1.67		
	Upper Helmet	0.78	1.98		
	Lower Helmet	0.93	1.81		
F-2	Cheek			0.76	1.86
	Upper Helmet			0.59	2.33
	Lower Helmet			0.71	2.25
G-3	Cheek			1.11	1.80
	Upper Helmet			0.92	3.02
	Lower Helmet			1.10	2.78
G-2	Cheek	2.82	3.41	2.54	2.69
	Upper Helmet	5.03	2.28	4.18	1.94
	Lower Helmet	3.58	2.42	2.73	2.09
K-1	Cheek	3.64	3.85	2.73	2.46
	Upper Helmet	6.30	3.08	3.62	2.63
	Lower Helmet	4.87	2.21	3.07	2.87
M-2	Cheek	3.23	4.71		
	Upper Helmet	6.59	3.63		
	Lower Helmet	4.86	2.44		
M10	Cheek	1.24	1.61	0.42	1.63
	Upper Helmet	1.24	1.65	0.59	1.93
	Lower Helmet	1.24	1.69	0.66	1.64
M11	Cheek	1.75	2.09	0.95	2.07
	Upper Helmet	2.52	2.29	0.84	2.46
	Lower Helmet	1.63	2.14	0.85	2.36
M13	Cheek	2.89	3.55	0.99	1.75
	Upper Helmet	5.01	2.17	0.97	2.26
	Lower Helmet	3.80	2.19	1.03	2.30
R-2	Cheek			0.84	1.58
	Upper Helmet			0.86	1.61
	Lower Helmet			0.96	1.63
R-3	Cheek	1.98	2.30		
	Upper Helmet	3.60	1.89		
	Lower Helmet	2.50	1.63		
S-3	Cheek			0.73	1.65
	Upper Helmet			0.92	2.72
	Lower Helmet			0.51	2.40

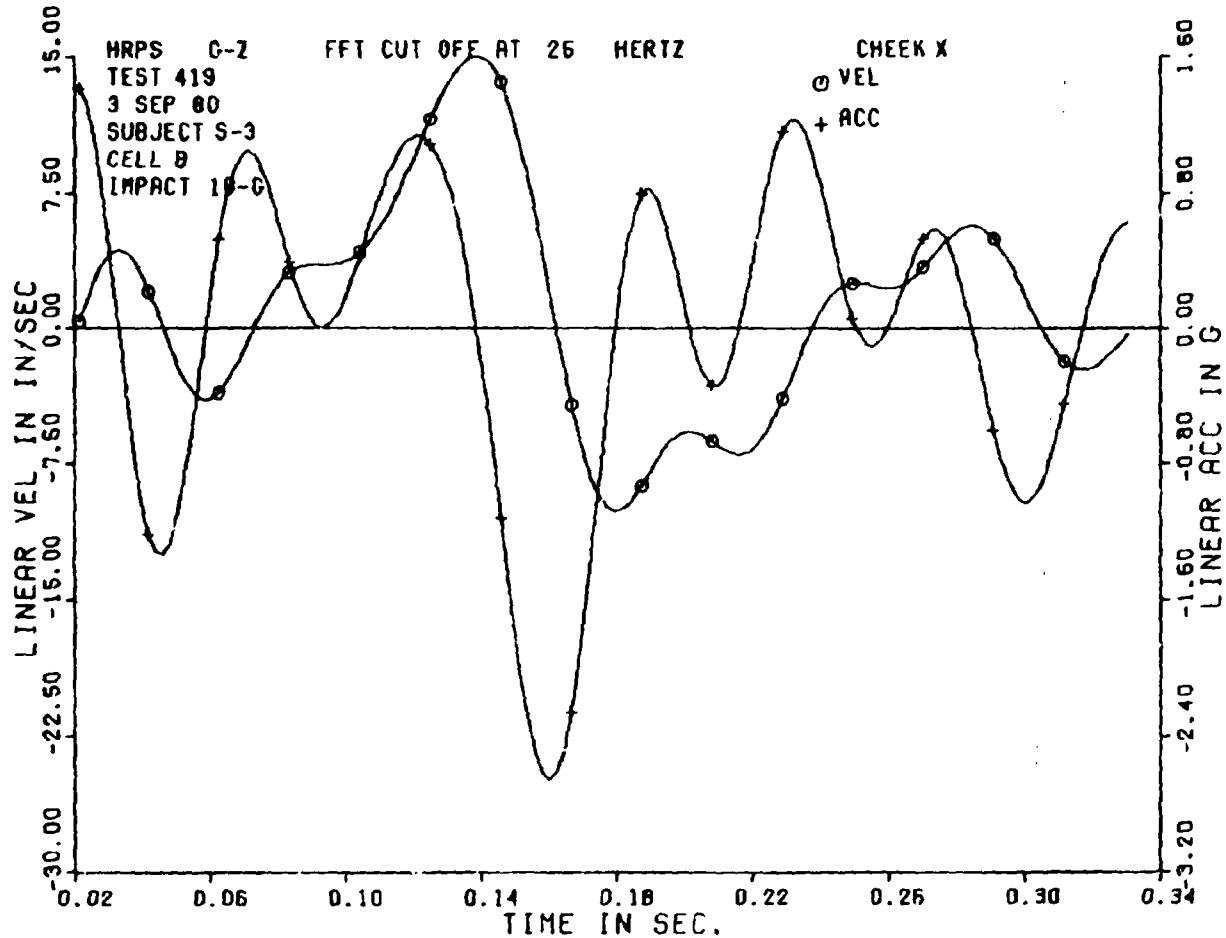
TABLE D-1 (continued)

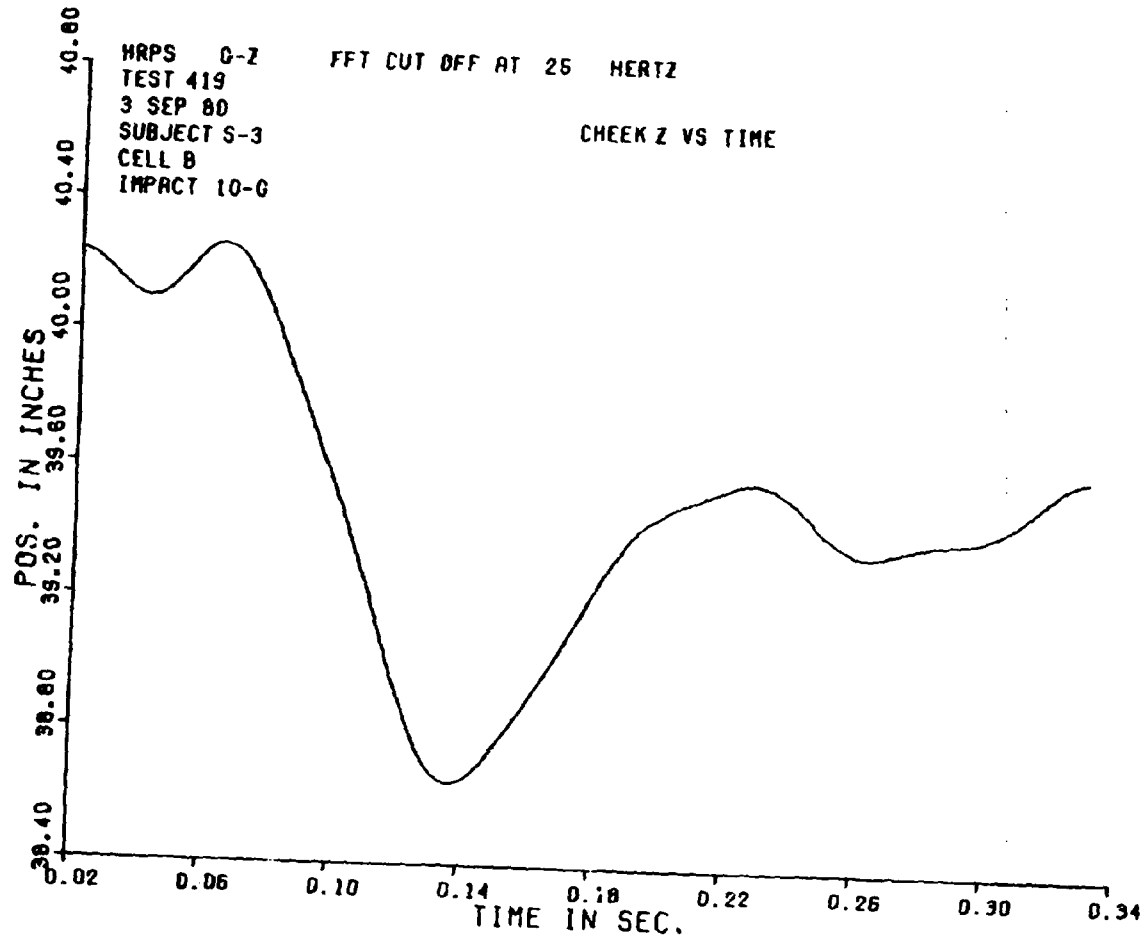
MAXIMUM HORIZONTAL AND VERTICAL DISPLACEMENTS (INCHES)
MEASURED AT THE HEAD AND HELMET FIDUCIALS

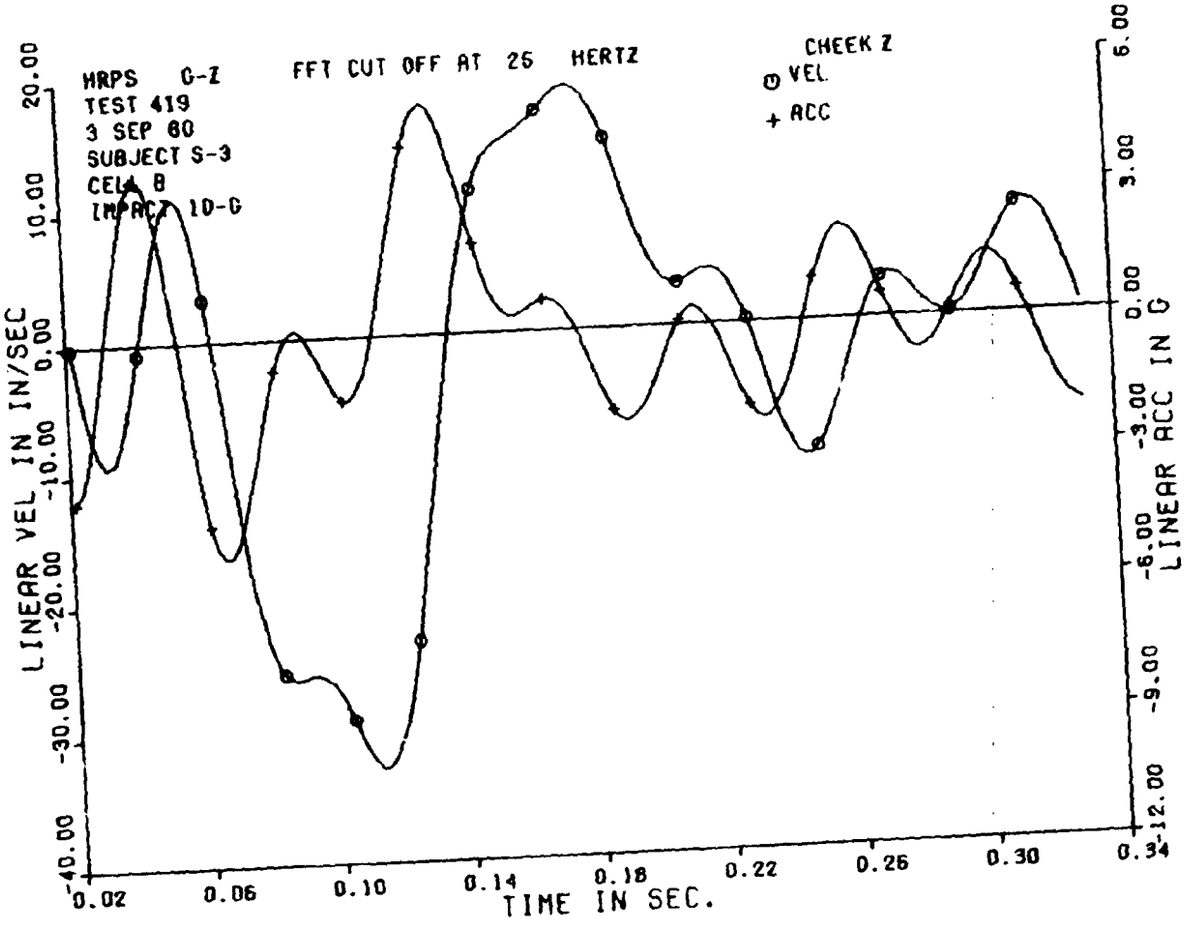
CELL OF MATRIX		E		F	
SUBJ	FIDUCIAL LOCATION	X_{MAX}	Z_{MAX}	X_{MAX}	Z_{MAX}
D-1	Cheek	1.53	2.15	1.06	1.61
	Upper Helmet	0.86	2.12	0.59	2.13
	Lower Helmet	1.32	2.11	0.75	2.09
E-1	Cheek				
	Upper Helmet				
	Lower Helmet				
F-3	Cheek	1.42	2.53	1.44	2.29
	Upper Helmet	1.92	3.10	1.70	3.95
	Lower Helmet	1.74	2.85	1.28	3.33
F-2	Cheek	1.42	2.79	0.78	1.83
	Upper Helmet	1.77	2.78	0.52	2.30
	Lower Helmet	1.48	2.83	0.94	2.08
G-3	Cheek			1.58	2.50
	Upper Helmet			1.12	4.71
	Lower Helmet			2.22	4.10
G-2	Cheek	1.39	2.00	1.67	2.68
	Upper Helmet	2.26	1.46	3.09	2.12
	Lower Helmet	1.79	1.43	2.29	2.04
K-1	Cheek			3.19	2.80
	Upper Helmet			4.12	2.92
	Lower Helmet			3.46	2.98
M-2	Cheek				
	Upper Helmet				
	Lower Helmet				
M10	Cheek	1.22	2.30	0.47	2.21
	Upper Helmet	1.58	2.08	0.47	2.92
	Lower Helmet	1.16	2.37	0.71	2.84
M11	Cheek	1.71	2.20	0.78	2.19
	Upper Helmet	2.45	2.92	0.61	2.91
	Lower Helmet	1.53	2.60	1.13	2.69
M13	Cheek	1.39	2.58	1.30	1.72
	Upper Helmet	2.46	2.23	0.96	2.88
	Lower Helmet	1.48	2.19	1.17	2.56
R-2	Cheek	2.16	2.81	0.72	1.98
	Upper Helmet	4.34	1.58	0.61	3.23
	Lower Helmet	2.97	2.08	1.44	2.87
R-3	Cheek				
	Upper Helmet				
	Lower Helmet				
S-3	Cheek	1.67	2.22		
	Upper Helmet	1.85	2.91		
	Lower Helmet	1.35	2.76		

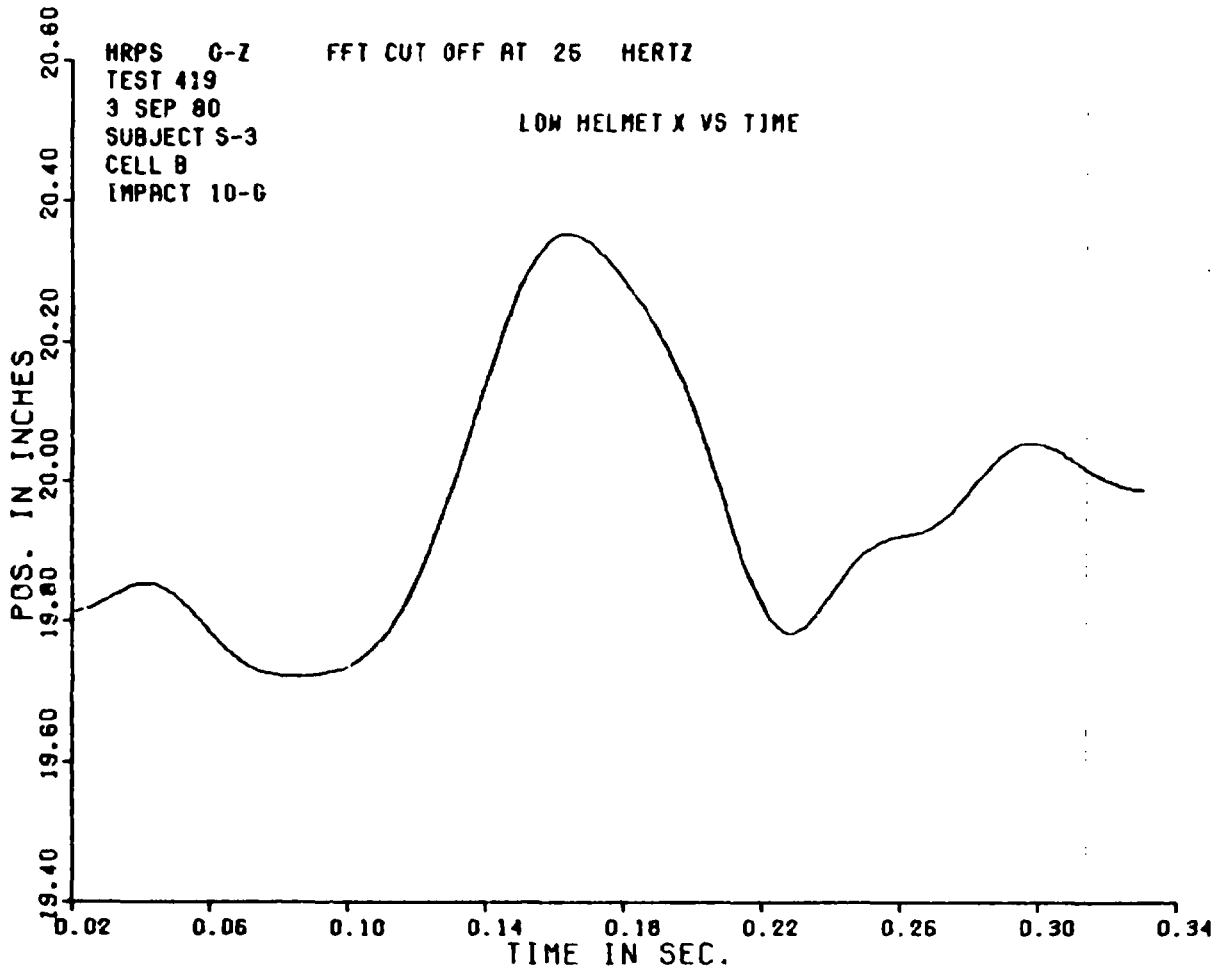

CHEEK
LOW HELMET
UP HELMET
SHOULDER
ELBOW
HRPS G-Z
TEST 419
3 SEP 80
SUBJECT S-3
CELL 8
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
ISOLATED SYMBOL MARKS PREDROP POSITION
Z POS. IN INCHES
44.00
40.00
36.00
32.00
28.00
24.00
20.00
DIRECTION OF IMPACT
14.00
16.00
18.00
20.00
22.00
24.00
26.00
28.00
30.0
X POS. IN INCHES

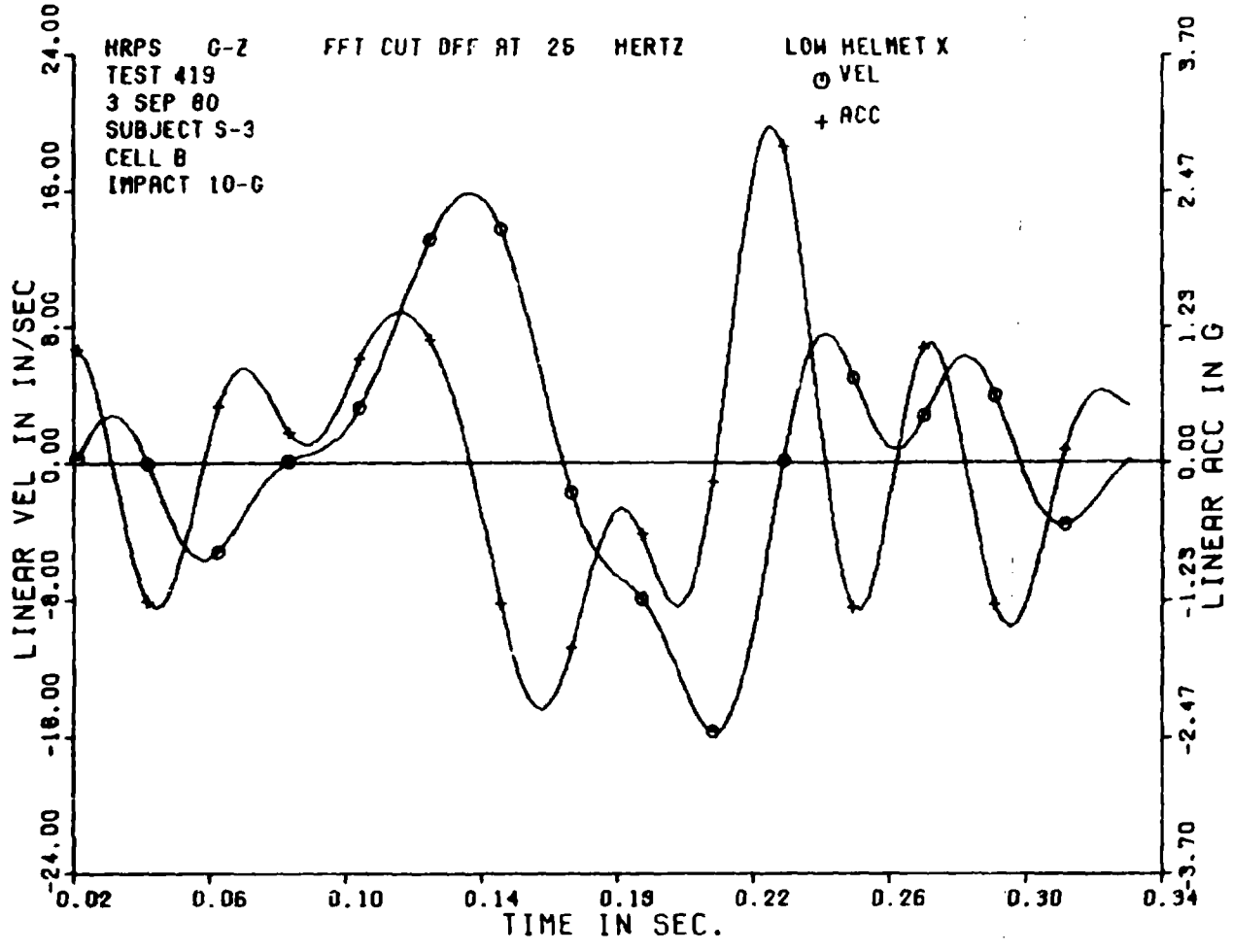

HRPS G-Z
TEST 419
3 SEP 80
SUBJECT S-3
CELL B
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
CHEEK X VS TIME
POS. IN INCHES
25.20
25.00
24.80
24.60
24.40
24.20
24.00
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34
TIME IN SEC.

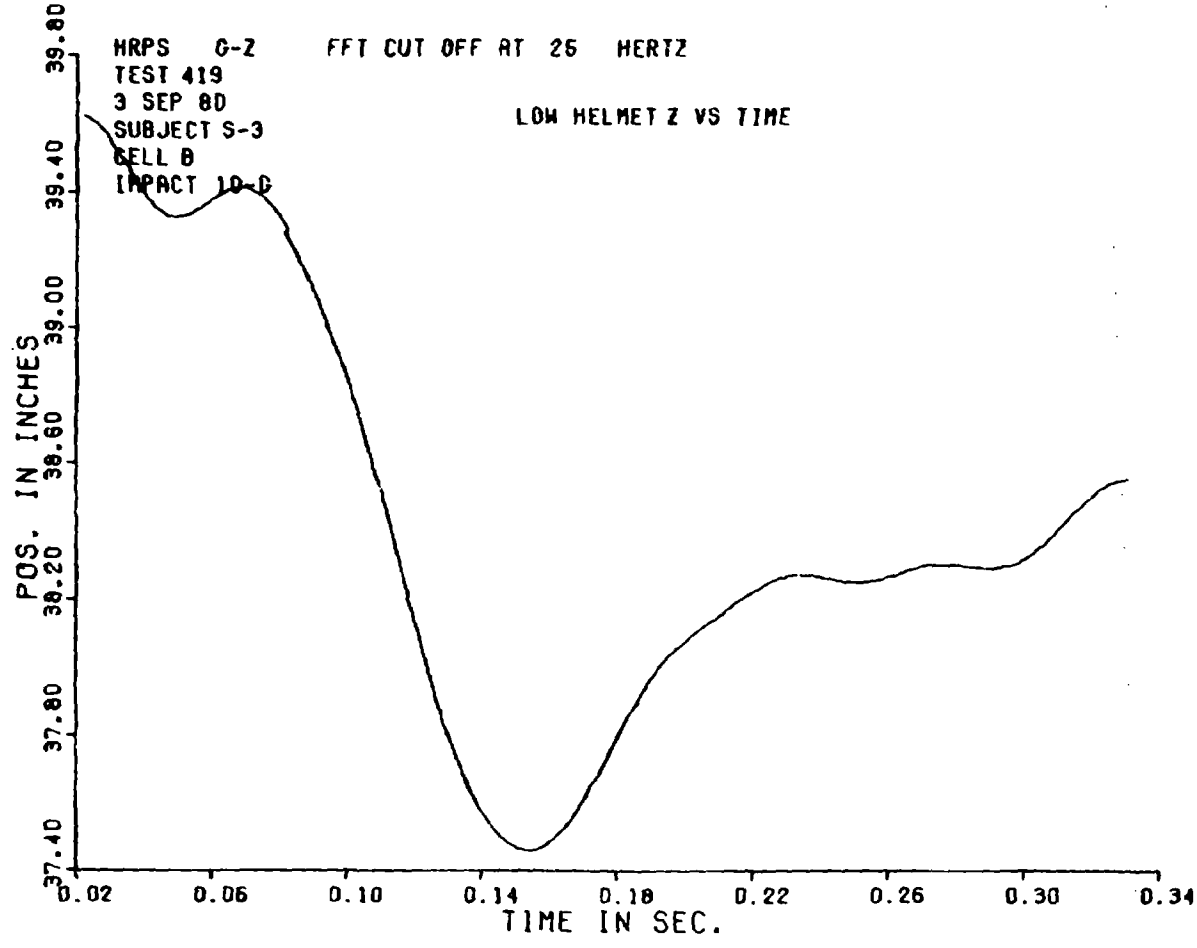

HRPS C-Z
TEST 419
3 SEP 80
SUBJECT S-3
CELL B
IMPACT 18-G
FFT CUT OFF AT 26 HERTZ
CHEEK X
VEL
ACC
LINEAR VEL IN IN/SEC
LINEAR ACC IN G
TIME IN SEC.
15.00
7.50
0.00
-7.50
-15.00
-22.50
-30.00
1.60
0.80
0.00
-0.80
-1.60
-2.40
-3.20
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34

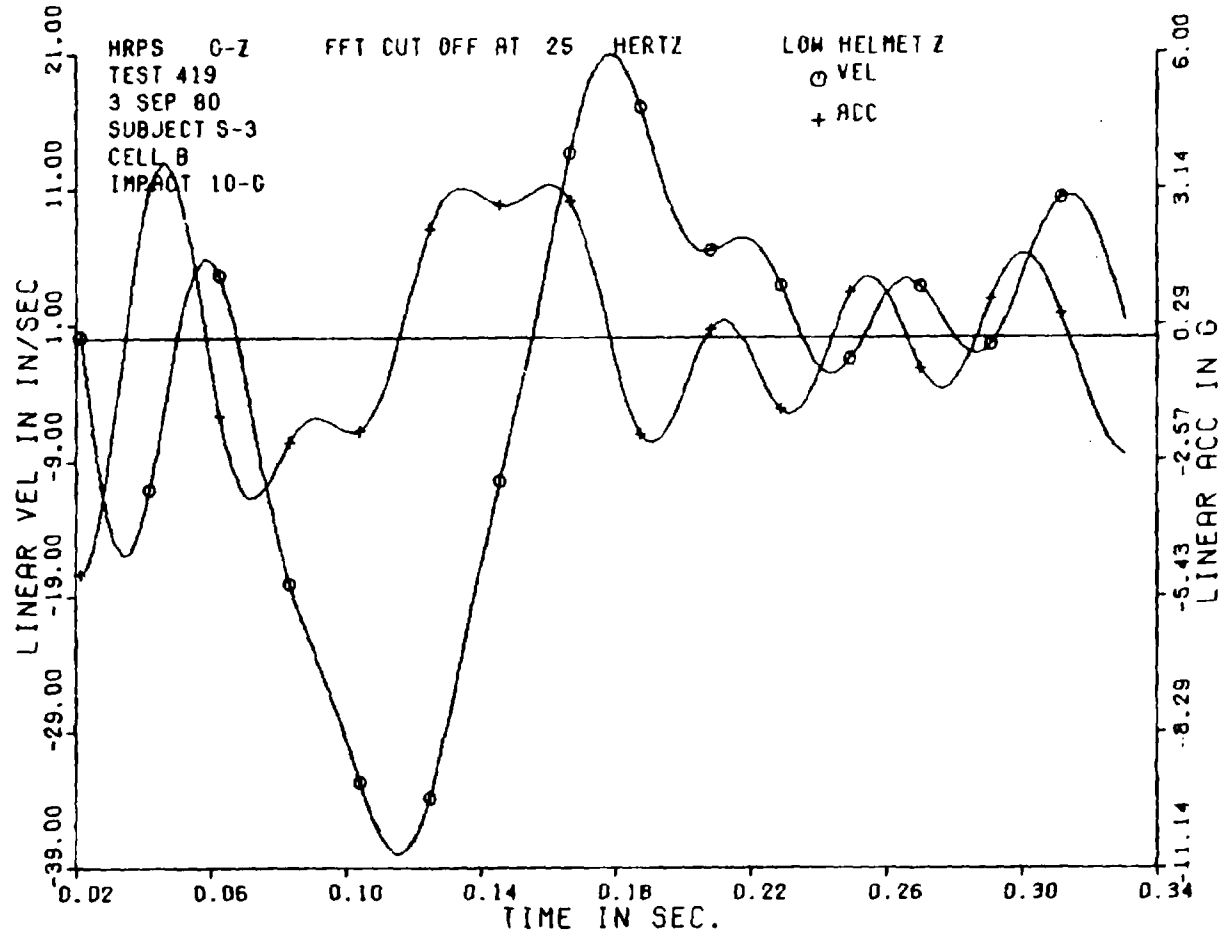

HRPS C-Z
TEST 419
3 SEP 80
SUBJECT S-3
CELL B
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
CHEEK Z VS TIME
POS. IN INCHES
40.80
40.40
40.00
39.60
39.20
38.80
38.40
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34
TIME IN SEC.


HRPS G-Z
TEST 419
3 SEP 80
SUBJECT S-3
CELL B
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
CHEEK Z
VEL
ACC
LINEAR VEL IN IN/SEC
LINEAR ACC IN G
TIME IN SEC.
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
6.00
3.00
0.00
-3.00
-6.00
-9.00
-12.00
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34


HRPS G-Z
TEST 419
3 SEP 80
SUBJECT S-3
CELL B
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
LOW HELMET X VS TIME
POS. IN INCHES
20.60
20.40
20.20
20.00
19.80
19.60
19.40
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34
TIME IN SEC.


NRPS G-Z
TEST 419
3 SEP 80
SUBJECT S-3
CELL B
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
LOW HELMET X
VEL
ACC
LINEAR VEL IN IN/SEC
LINEAR ACC IN G
TIME IN SEC.
24.00
16.00
8.00
0.00
-8.00
-16.00
-24.00
3.70
2.47
1.23
0.00
-1.23
-2.47
-3.70
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34


HRPS G-Z FFT CUT OFF AT 25 HERTZ
TEST 419
3 SEP 80
SUBJECT S-3
CELL B
IMPACT 10-G
LOW HELMET Z VS TIME
POS. IN INCHES
39.80
39.40
39.00
38.60
38.20
37.80
37.40
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34
TIME IN SEC.


HRPS C-Z
TEST 419
3 SEP 80
SUBJECT S-3
CELL B
IMPACT 10-G
FFT CUT OFF AT 25 HERTZ
LOW HELMET Z
VEL
ACC
LINEAR VEL IN IN/SEC
21.00
11.00
1.00
-9.00
-19.00
-29.00
-39.00
LINEAR ACC IN G
6.00
3.14
0.29
-2.57
-5.43
-8.29
-11.14
0.02
0.06
0.10
0.14
0.18
0.22
0.26
0.30
0.34
TIME IN SEC.

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